



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

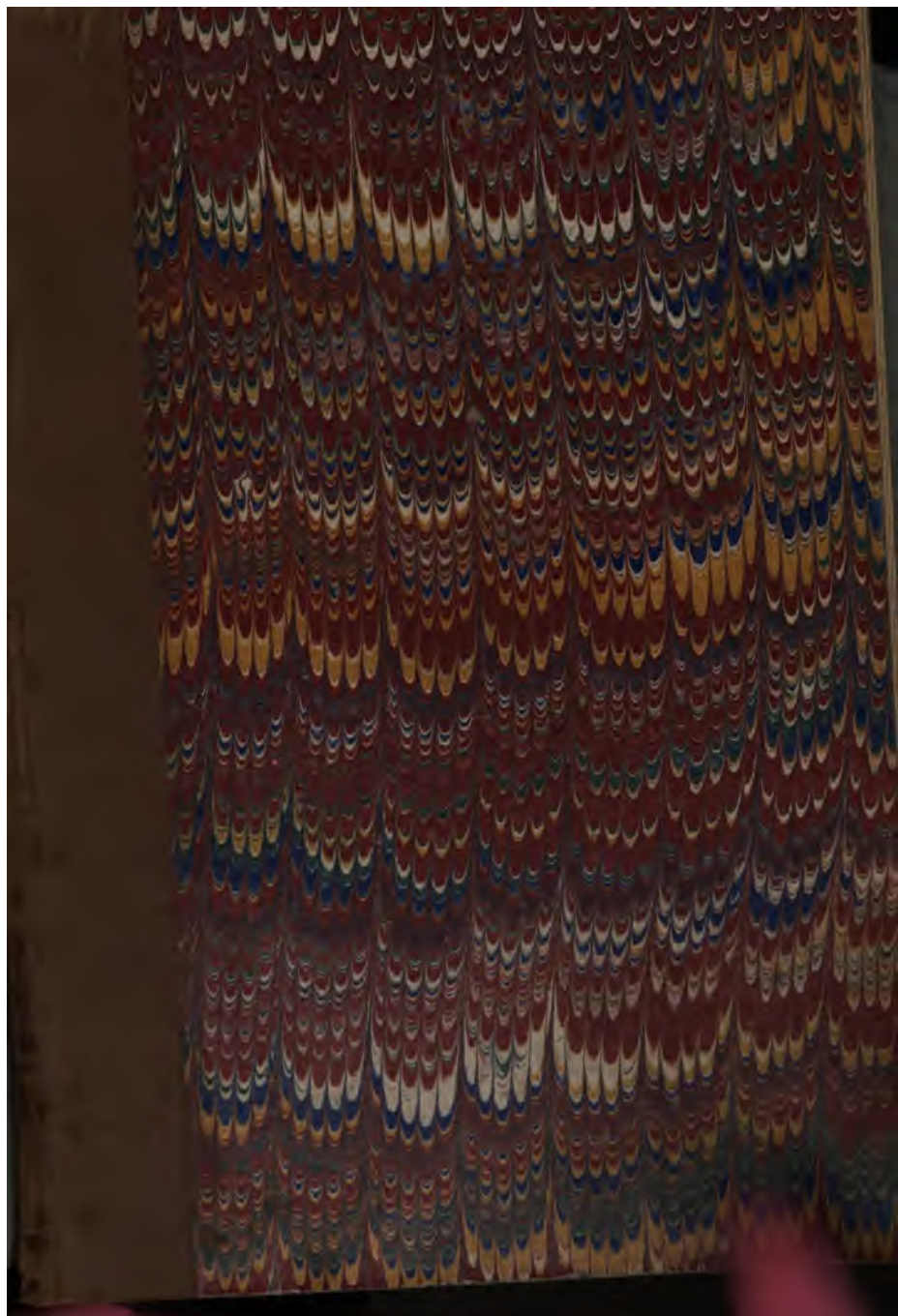
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>





600040461L

pt. 73





PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO

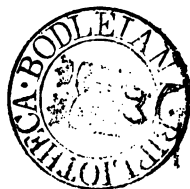
MASTS, SAILS, RIGGING, &c.;

INCLUDING

APPARATUS FOR RAISING AND LOWERING
SHIPS' BOATS.

A.D. 1625-1866.

PRINTED BY ORDER OF THE COMMISSIONERS OF PATENTS.



LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.

PUBLISHED AT THE
OFFICE OF THE COMMISSIONERS OF PATENTS FOR INVENTIONS,
25, SOUTHAMPTON BUILDINGS, HOLBORN.

1874.

176 i. 39.

P R E F A C E.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in future editions.

This volume contains Abridgments of Specifications to the end of the year 1866. From that date the Abridgments

will be found in chronological order in the "Chronological and Descriptive Index" (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The inventions included in this series are such as relate to masts, yards, booms, bowsprits, and other spars; rigging; sails, reefing and furling the same, materials for sails, and the manufacture of sail-cloth; also raising and lowering ships' boats.

The following inventions have not been included, but will be found in the volumes of Abridgments named below:—

For improvements relating to the hull, &c., *see* "Ship Building, Repairing, Sheathing, Launching," &c.—to windlasses, capstans, ships' riding bits, cable stoppers, and tackle blocks, *see* "Raising, Lowering, and Weighing,"—to propelling vessels, *see* "Marine Propulsion,"—to nautical instruments, logs, leads, &c., *see* "Optical, Mathematical, and other Philosophical Instruments, including Nautical, Astronomical, and Meteorological Instruments,"—to anchors, *see* "Anchors,"—to rudders and other steering apparatus, *see* "Steering and Manœuvring Vessels,"—to canvas generally, *see* "Weaving."

Ropes, chains, and wire ropes (for standing rigging) will be treated of in series to be hereafter published.

December, 1874.

B. WOODCROFT.

INDEX OF NAMES.

[The names printed in *Italic* are those of the persons by whom the Inventions have been communicated to the Applicants for Letters Patent.]

	Page		Page
Absterdam, J.....	115	Boucherie, H.....	89
Adams, W. B.....	39	<i>Boucherie, H.</i>	93
Aldborough, B. O'N. S. Earl		Boussois, F. J. E. D. de.....	154
of.....	78	Brabazon, J. D.....	133
<i>Allen, W. H.</i>	152	Braddon, W.....	229
Allix, G.....	211, 234	Brayshay, R.....	6
Ambrose, E.....	229	Brims, D.....	71
Armitage, W.....	88	Brooking, S.....	28, 28
Atlee, J. F.....	19, 26, 27	Brooman, R. A.....	57, 62
Ayre, J.....	47	Brouard, J.....	98
		Brown, A.....	132
Baillie, R.....	190	—, J.....	103, 104
Baines, E.....	214	—, S.....	11
Balans, R.....	203, 203	<i>Brown, S.</i>	230, 241
Barland, M.....	199, 208	Brown, W. H.....	173
<i>Barland, T.</i>	199, 208	—, W. S.....	47
Barnwell, S.....	157	Browne, J.....	50
Barré, M. N. L. R.....	41	Bruce, J.....	214
Bauer, W.....	79	Buchanan, J.....	39
Baw, G. W. La.....	113	Bull, A. B.....	220
Beadon, G.....	34, 44, 135	Burnett, W. S.....	19
—, W.....	131	Butchart, J.....	213, 219
Beale, W.....	1	Butcher, M.....	176
Bell, J.....	221	Bywater, J.....	10
Bennett, S.....	167		
Benson, R. B.....	102	Calvert, W.....	116
<i>Bentley, A. J.</i>	152	<i>Camp, M. M.</i>	125
<i>Berly, J. H. C. de.</i>	178	Campbell, P.....	160
Bettleley, J.....	81, 107	Campion, R.....	13
Bill, R.....	15, 15	<i>Carleton, G. H.</i>	147
Blake, R. F. S.....	34	Carvalho, D. N.....	37
<i>Bonnet, J. L. H. E.</i>	163	Cassap, W.....	240
Bonneville, H. A.....	239	Cato, P.....	107
Borrie, P.....	45	Cavanah, J.....	77
<i>Boss, J.</i>	102, 112	Cave, W.....	124

	Page		Page
Chalmers, D.....	166, 173	Dempster, C.....	8
Chaplin, A.....	222	De Wardin, W. le, Baron	
Chapman, C.....	238	de Traux.....	52
——, J. T.....	53	Dewy, H.....	60
Chatten, J. P.....	44	Dickinson, R.....	12
Chubb, W.....	82	Dodge, J. T.....	74
Christophers, J.....	50	Doncaster, W.....	13
Clare, J.....	73	Dowson, J. E.....	189
Clark, W.....	104, 143, 144, 163, 179, 230, 241	Dunbar, A. A.....	105
——, W. S.....	133	Dunkin, H.....	7
Clarke, J. W.....	26	Dunn, T.....	176
Clifford, C.....	66, 96, 125	Dyer, S.....	93, 96, 106, 122
Clough, C. B.....	63	Eaton, R.....	103
——, M.....	200	Eccles, R.....	14
Cole, J. E.....	111	Edwards, E.....	165
Colegrave, F. E.....	52	——, R. D.....	139
Coles, C. P.....	177	Ellercamp, J. M.....	158
Colling, J.....	177, 194	Elliott, T. A.....	187
Collins, J. S.....	114, 169	Elwell, J. B.....	196
Congalton, W.....	217	Ennis, G.....	60
Cook, H. O.....	183	Evans, T.....	80
——, T.....	31	Fanshawe, H. R.....	59
Cordner, E. J.....	146	Fergus, J.....	210
Coutanche, H.....	219	Ferguson, C. A.....	26, 101
Cowan, M.....	10	Ferrier, J.....	227
Cowper, C.....	93	Fillier, J. M.....	89
Crocker, E. J.....	113	Finch, E.....	72, 99
Croix, F. C. La.....	108	Finlay, R. F.....	150
Cunningham, H. D. P.....	54, 88, 98, 109, 120, 141, 151, 164, 181, 196, 209	Fisher, C. R.....	223
Dando, W. E.....	138	Fontainemoreau, P. A.....	83
Davidson, H.....	158	Foster, S.....	201
——, J.....	230	Forge, W.....	238
——, W.....	232	Fox, W. T.....	122
Davies, G.....	125	Fuller, J. W.....	153
Dawson, J.....	(<i>App.</i> 243)	——, W. C.....	78
Day, T. senior.....	208	Galloway, G. B.....	117, 142
——, T. junior.....	208	Gamble, H. C.....	198
——, W.....	39	Gandy, M.....	216
Deane, E.....	225, 228	Garde, P. C. de la.....	29
<i>De Berly, J. H. C.</i>	178	Gardner, J.....	32, 120
De Boussois, F. J. E. D.....	154	——, R.....	32
De La Garde, P. C.....	29	Gerard, W.....	237
Delolme, J. L.....	3	Getty, J.....	70
		Gibson, G.....	218

INDEX OF NAMES.

vii

	Page		Page
Gifford, W. J.....	118	James, W. H.....	77
Gilbart, F. H.....	174	Jay, A. T.....	165
Gilbee, W. A.....	102, 112	Jeffery, A.....	42
Gilbert, T. W.....	46	<i>Jennings, I.</i>	12
Gladstone, G. J.....	114, 168	Johnson, J. H.....	140, 178
——, S. P.....	91	Jones, R.....	148
Glover, T.....	222	Jordan, H.....	185
Goodet, A.....	109	Jordeson, T. P.....	154
Goodwin, C.....	46	Jürgens, J. L.....	192
Goudie, J.....	171		
<i>Gove, A.</i>	237	Kendal, T. A.....	160
Gower, R. H.....	5	Kennedy, J.....	193
Gray, T.....	114	King, H.....	23
Green, R.....	29	Kingston, W.....	23
Greer, J. J.....	43	Knowelden, J.....	139
Grignon, G.....	85	Kynaston, A. F.....	112, 121
Guppy, T. R.....	19		
Guthrie, R. D.....	148	La Baw, G. W.....	113
		Lacon, W. S.....	57
Hann, W.....	82	La Croix, F. C.....	108
Harratt, C.....	64, 178, 182	La Garde, P. C. de.....	29
Harrington, G. H.....	212	Lambert, H. T.....	147
Harris, Sir W. S.....	67	Lamport, C.....	56, 72
Hart, J.....	205, 216	Laphorn, W. H.....	184
Harvey, S.....	223	Lawson, J.....	65
Heathorn, J. L.....	33	Lee, R.....	120
Heathcote, Sir H.....	17	Leigh, E.....	170
Hebson, D.....	128	Lenox, T.....	79
Henson, J.....	154	<i>Le Rouge, J. P. V.</i>	178
——, W. P.....	154	<i>Level, L.</i>	230, 241
Hewetson, F. Y.....	212	Leverson, M. R....(<i>App.</i> 244)	
——, H.....	212	Lewis, J.....	1, 84, 137
Hewitt, S. G.....	202	Livingston, R. M.....	137
Higgins, J. L.....	18, 24, 37	Long, J.....	66
——, L.....	132	Lonsdale, W.....	4
Hill, L.....	84	Lord, W. B.....	174
Hillman, T.....	27	Lungley, C.....	242
Hodgson, J.....	105	Luscombe, M.....	4
Holmes, W.....	1	Lynch, P. F.....	152
Howard, S.....	215		
Hubert, J.....	98	Maberly, F. H.....	36
<i>Huntington, T.</i>	239	Maccarthy, J. J. A.....	48
Huntley, H. V.....	38	Macintosh, J.....	56
Hurn, D.....	228	Manifold, J.....	228
——, G.....	228	March, C.....	97
		Matthews, A.....	67
Irvine, T.....	101	May, E. R.....	235

	Page		Page
McGavin, R.....	64	Pocock, G.....	25
McMahon, W.....	6	Poole, M.....	41, 45
Medhurst, J.....	173, 233	Prideaux, T. S.....	148
Miller, S.....	2	Prior, W.....	29
Mills, A.....	182	Puis, P. A.....	62
——, J.....	187		
Moore, R.....	179	Ralston, G.....	172
——, T.....	159, 168, 176, 206	Ramsay, A.....	31
Morgan, J.....	165	——, J.....	31
Morrison, S. A.....	219	Ramsten, C. H.....	236
Mortimer, C.....	131	Ricketson, B.....	179
Mulliner, E. E.....	144	Rickman, W. C.....	224
Murton, J. M.....	87	Rixon, F.....	76
Murray, D.....	241	Robb, J.....	84
Murray, D.....	237	Roberts, R.....	58
Murray, J.....	226	——, T.....	35
Myers, G.....	185, 191	Robertson, J.....	133
		Rogers, R.....	16
Napier, G.....	91	——, M. D.....	144, 146
Nash, J.....	145	Rollason, A.....	157
Newall, R. S.....	49, 75, 86, 189	Rotch, B.....	16, 26
Newman, J.....	90	<i>Rouge, J. P. V. le</i>	178
Newton, A. V.....	81, 100	Rowden, W.....	201, 207
——, D.....	49	Rowett, W.....	86
——, W.....	40, 54, 54	Russ, B.....	194
——, W. E.....	95, 152	Russell, G. F.....	68
<i>Niles, P. H.</i>	140	Rylands, J.....	64
Norman, J.....	62, (<i>App.</i> 244)	<i>Rylands, J.</i>	72
		Rylands, M. A.....	72
O'Keefe, T.....	199		
Oliver, E.....	185, 191	Sager, W.....	49
Orr, M.....	31	Sands, W. A.....	167
Orton, R.....	47	Saunders, E.....	2
		Saxby, S. M.....	70
Panton, H.....	217	Scarth, M.....	9
——, T. W.....	217	Scott, J.....	159
Parker, J.....	143	——, M.....	55
Parkhurst, S. R.....	92	Selby, G. T.....	164
Payne, H.....	152	Seppings, Sir R.....	23, 25
Pearce, H. G.....	32, 120, 128	Sharp, C.....	111
Pearson, W.....	207	Sharpe, B.....	179
Penneck, H.....	7	Shibles, G. W.....	115
Perkes, S.....	61	Shores, J.....	32
Perley, C.....	185	Shorey, T.....	212, 218
Phalp, O.....	204	Shulldham, M.....	20, 138
Pinkney, D. G.....	194	Silver, T.....	168
Pirnie, A.....	80	Silvester, G.....	(<i>App.</i> 243)

INDEX OF NAMES.

ix

	Page		Page
Simons, W.....	129, 149, 165, 168	Turnbull, J.....	201
Simpson, C. H.....	225	Turpie, J.....	147
Slater, J.....	8	——, T.....	156
Sloper, J.....	117	Tynan, J.....	152
Smallwood, W.....	204, 207		
Smart, G.....	6	Wagenen, W. M. van.....	198
Smith, A.....	35, 38	Wain, G. H.....	130
——, P.....	101	Wakeman, L. B.....	133
Snider, J.....	172	Walker, T.....	171
Snider, J.....	181	Waller, R.....	142
Soelman, W.....	83	Wardin, W. le Baron de	
Spencely, J.....	48	Traux de.....	52
Steel, T.....	221	Wart, H. Van.....	12
Stephen, A.....	80	Watson, F.....	55
Stocks, G. L.....	69, 75	——, G.....	166
Stollmeyer, C. F.....	41	——, G. W.....	169
Stothard, D.....	148	——, T.....	69
Stroud, H.....	213, 219	Webster, W.....	127
Summers, J.....	63	Wells, C.....	226
Swinburne, T. A.....	212	Wheatley, J.....	197
Symes, J.....	199	White, H. B.....	238
		Whittle, W.....	90
Talbot, W.....	126	Willett, T. W.....	186
Tate, J. M.....	192	Wilson, C.....	11
Taylor, J. H.....	157	Winspear, J.....	43
——, W. W.....	33	Wood, E. A.....	144, 146
Terrey, E. G.....	183	——, W.....	215
Thompson, E. U.....	155	Woodley, W.....	39
Thorne, T.....	184, 188	Wright, J.....	94
Thornton, J.....	238	Wymer, F. W.....	69
——, T.....	237		
Tilston, J.....	165	Vandereruyce, H.....	161
Todd, J.....	209	Van Wagenen, W. M.....	198
Tonge, D.....	17	Van Wart, H.....	12
Trail, A.....	43	Vine, J.....	(App. 244)
Trevithick, F.....	134	Viney, J.....	25
——, R.....	12		

INTRODUCTION.

To treat properly so large and important a subject as that relating to the fitting and equipment of ships would be so utterly impracticable within the limits of the present work, that no attempt thereat will be made. Some few remarks, however, may be given, which it is hoped may serve as a useful introduction to the descriptions of separate inventions given by the abridgments contained in the present volume. It is to be remembered that this series of abridgments deals only with the rigging (in the widest sense of the word), and that any consideration of either the construction or the navigation of ships is excluded from this introductory matter, as well as from the body of the book.

It is quite certain that there is no possible knowledge to be obtained about the character of the earliest vessels used. The early history of the art of navigation is lost in the mists of antiquity, and we can only obtain any knowledge of it either from analogy, often fallacious, by a consideration of the vessels used among savage or semi-civilized peoples, or from the representations and accounts of times which, though ancient and obscure, do yet come within the furthest limits of history.

There are three sources from which we can acquire this knowledge. First, the sculptures of Assyria; second, the paintings and sculptures of Egypt; third, and most important, the accounts of early Greek authors. From these sources we are enabled to collect, at all events, a sufficient amount of information to enable us to picture to ourselves with some approach to distinctness, the vessels in which the first sailors ventured themselves upon the sea. This much may be safely assumed, that we get authentic descriptions of vessels so primitive in their rig and construction, that it is difficult to imagine any much simpler form which can have preceded them. The bark canoe of various savage races, or the almost equally rude "dug-out" canoe, formed by burning and

hacking out the interior of a tree-trunk, may be held as the simplest and most original description of craft imaginable,* but after these we cannot have any vessel more primitive than that described by Homer as constructed by Odysseus, to which further allusion will be made later on.

In the Assyrian sculptures are numerous representations of ships, many of which are supposed to represent ships of Tyre, and to be referred to a period during the Persian supremacy. The conventional character of the representations prevents us from discovering much about their usual rig. Some of them are shown with a mast and a yard, and a sail furled upon the yard. The mast is supported by stays, and there are ropes proceeding from the ends of the yard, by which we may presume it was worked. We cannot, therefore, from this source obtain much information as to the rig used in the most ancient vessels.

Of the Egyptian vessels a sufficient number of representations have been discovered to enable us to form a tolerably clear idea of their structure and equipment. Sir Gardner Wilkinson, in his elaborate work on the subject,† gives a very full account of them. They had one mast, stepped into a strong beam transverse to the boat, and supported by a knee of some height, and numerous stays. The sail was square, sometimes of papyrus, and possibly resembling that of a Chinese junk, or the laths of a Venetian blind. There were sometimes one, sometimes two yards, and the sail was either furled up to the single yard, when one only was used, or, when there were two, the upper yard was lowered. It is uncertain whether they used pulleys for raising and lowering the yards, or if the halyards merely passed through a smooth sheave hole. The yards were of great size, supported by several lifts, and fitted with braces. The sails were often richly dyed and ornamented. In one vessel a double mast is shown, like a pair of shear-legs, with the yard between them.

Of the earliest vessels employed by the Greeks, as well as of those in use at later periods, both by the Greeks and Romans, a very full and exact account is given in Dr. Smith's

* Sir John Lubbock (*Prehistoric Times*, p. 8, edit. 1872), describes a canoe found among the relics discovered in the peat-bogs of Sleswick.

† *Manners and Customs of the Ancient Egyptians* (edit. 1847), vol. 3, p. 184, *et seq.*

well-known Dictionary of Antiquities, under the article *Navis*. Reference may also be made to Dr. Potter's "Grecian Antiquities," and to other similar works for information on this interesting subject.

It is in the Homeric poems that the first definite description of any vessel is given. In the *Iliad** we find a good deal said about the ships which carried the Argive warriors on that memorable expedition against Ilium, and in the *Odyssey*† is given a full and detailed description of the ship constructed by Odysseus for his escape from the island of Calypso. Unfortunately this last passage is by no means easy of translation. It has caused much perplexity in the mind of Homeric scholars, and there are many points in it which do not appear capable of ready explanation. It had a mast (*ιστόν*) and a yard (*ἐπικρίριον*). There was also a sail (*ιστία*). The tackle generally is described in the line‡—

ἐν δ' ὑπέραις τε κάλους τε πόδας τ' ἐνέδησεν ἐν αὐτῇ.

What are the exact meanings of the three words describing the three different sorts of ropes it is difficult to say. The *πόδες* may certainly be taken to be the sheets made fast to the clews or "feet"§ of the square sail. The *κάλοι* seem to have been the halyards for hoisting the yard, while the *υπέραι* are generally understood to mean the braces, though it is not easy to see the necessity for braces in a mere boat such as that described. However it seems certain that the sail was worked on the principle of a modern ship's courses, and not like the ordinary lug-sail of a boat. This very convenient rig does not appear to have suggested itself to the ancient mariners. It therefore may be the case that braces were used even in such small craft as the one under discussion.

No further particulars are to be gathered from this description. From other allusions in the *Iliad* and *Odyssey*,|| it appears that the mast was supported by a fore-stay and a back-stay, by means of which it could be raised and lowered. It does not appear that there was more than a single sail, and this could only be used in going before the wind, as is indeed

* Il. ii. 510, *et al.*

† Od. v. 243, *et seq.*

‡ "And he bound therein the yard-ropes and the cables and the sheets." Od. v. 260.

§ *πoύς* a foot.

|| Il. i. 434; Od., 12, 409.

obvious from the description above. It is, however, to be remembered that these vessels, and indeed all vessels down to a much later period, depended almost entirely on their oars for propulsion. The sail was never more than an auxiliary.

The galleys as we know of them in use among the Greeks and Romans were of precisely similar character. It is a matter for sincere regret that we know so little of the history or habits of the great maritime people of antiquity, the Phœnicians, or of their colony Carthage, which disputed with Rome the dominion of the world, after teaching her—if the history be true—the art of navigation. The ships which sailed beyond the Pillars of Hercules northwards to our own Cornwall, and southwards to the Niger, must have been far better found and equipped than the coasters which were quite competent to navigate the bays and archipelagos of the Mediterranean. It is however reasonable to suppose that it was in superiority of construction and arrangement, not in character, that they differed from those of which we have tolerably full descriptions, and we may take it that there was but one principal type for all the galleys of antiquity.*

This, so far as rig is concerned, differed not very greatly from Homer's ship. There were sometimes two, or even three masts (*ιστός, malus*). An Athenian trireme† had two masts, some larger vessels three. In all cases the larger mast appears to have been that nearest the stern. The mast was sometimes supported by props or supports (*παραστάται*), also by stays (*πρότονοι, καλφῆδια, κάλοι*). The yard (*κέρας, κεραία, antenna*) slid on the mast by means of a hoop thereon. It was supported by braces and halyards (*ἰμάντες, κεροῦχοι, ceruchî, ἄγκουα, anguina, ὑπέραι, opiferae*) in a manner not very precisely known, but so that it could be hauled up and down in the usual manner. Above the yard was a sort of crow's nest (*καρχήσιον, carchesium*). There was generally only one sail

* It may be noted that reference is made in Ezekiel, chap. 27, to the ships of Tyre. Speaking of them, the writer says (v. 5), "They have taken cedars" from Lebanon to make masts for thee"; and (v. 7), "Fine linen with bordered" work from Egypt was that which thou spreadest forth to be thy sail."

† A vessel with three banks of oars. How these oars were arranged is one of the most puzzling questions relating to ancient ship-building. It cannot, however, be entered on here. Dr. Arnold in his Thucydides has an elaborate *excursus* on the subject, though it is by no means to be admitted that the learned doctor's arguments are conclusive to all who have studied the question.

(*ιστίον velum*) on each mast, though sometimes a top-sail of similar shape was added. The shape of the sails was almost universally square, though the Romans sometimes used a triangular sail with one edge attached to the yard and the opposite corner hanging vertically downwards. The sails could be furled by being triced up to the yard, as is shown in numerous ancient representations of ships. The ropes (*τοπεία*) were originally thongs of leather, afterwards proper cordage was used. The different portions of the rigging have already been mentioned. It may be added that there was a rope called *χαλινός*, the bridle, as to the use of which no suggestion appears to have been made.*

We may now pass on to the ships of the chief maritime nations of the medieval ages. The dromonds of the northmen and all the galleys of the Scandinavian and Teutonic peoples seem to have been of the very simplest rig. There was one large square sail supported by a yard and very similar to those of the Roman galleys. The sail was of leather or fabric, often richly ornamented. The extensive use of oars for propulsion probably prevented much improvement in the rig of sailing vessels, for until about the middle of the thirteenth century we do not find much improvement in this direction. As the vessels then began to increase in size, a second mast was added, rigged much in the same way as the first, but no bowsprit. In 1268 some vessels were constructed by the Genoese for Louis IX., and the contracts for their construction have been published by M. Jal, in his great work on the subject.†

Two of these ships were alike and were 50 cubits long. The foremast was 51 cubits long and $12\frac{3}{4}$ palms in circumference. The main-mast was 47 cubits long and $11\frac{3}{4}$ palms in circumference. The fore-yard was 100 cubits long, and was made in three pieces. The main-yard was 96 cubits. There was also a separate yard of 96 cubits for the "velon" a large sail supposed to have been used as an additional sail when going before

* It may in fairness be stated that the writer of this notice can make no pretence either to such scholarship on the one hand, or such seamanship on the other, as should qualify him to offer an authoritative opinion on the above questions. The description has merely been compiled from generally accessible works on the subject (principally from Smith's Dictionary above-mentioned), and is only introduced here in the hope that it may prove of interest and of service to those who have not the time or the opportunity to investigate for themselves the original authorities.

† Archéologie Navale. Paris.

the wind, and to have been hoisted on the foremast. There were six sails in all. M. Jal considers that these sails were triangular and that the vessel was lateen rigged,* and he is probably correct, for several early drawings show boats with this rig and with a sprit.

When we get down to the time of the Spanish Armada we find that the general appearance of the ship has developed into a pretty close resemblance to the modern rig. The pictures representing the vessels of that great fleet show that, in spite of the great difference in the shape of the hulls, the ships on the whole resemble those we are now familiar with. The great difference is in the fore-sails. Although cutter-rigged vessels were known at this time, there is no reason to suppose that any but square sails were used in large vessels. Thus the fore-sail is a small square sail on a short mast, an arrangement which can have helped but little in the steering of the ship.

Such is a very brief sketch of the early history of the art. So much has been written on its later development that there is no need to enter more on that subject here. Indeed the Abridgments themselves afford material for almost a complete history of this department of naval architecture.

* For further information on these and similar points, reference may be made to Steinitz's book on "The Ship," whence much of the above is taken. Though not remarkable for accuracy, it contains much curious information.

MASTS, SAILS, RIGGING, &c.

A.D. 1625, August 1.—N^o 32.

BEALE, WILLIAM.—“A newe invencon by hym lately found
“out, howe by the vse and applyinge of certen compounded
“stufes and waters called or knowne by the name of cement
“or dressing for shippes, aswell the bulkes, hulles, and bodies
“of shippes, and other vesselles, as their mastes, deckes,
“tackle, sayles, and other furnitures, maie be p^rserved in fight
“att sea from burning or consumyng by wyldfyer or gun-
“powder, and alsoe howe by the like meanes such shippes
“and vessels as are bound for longe voyages maie, without
“sheathing or other like charge, be p^rserved from hurte by
“the sea worme or barneacle, whereby manie shippes of greate
“value are often tymes vtterly spoyled.” “The said com-
“pounded stufes, waters, cement, and dressinge for shippes,”
“to be made and extracted out of certaine myneralls, and
“native materialls of this our realme of England and
“domynion of Wales.”

[No Specification enrolled. Letters Patent printed, price 4d.]

A.D. 1730, May 9.—N^o 516.

HOLMES, WILLIAM.—“A pole mast vessell for the better and
“more expditiuous and easy catching, preserving, and stowing
“of all sorts of fish.”

[No Specification enrolled. Letters Patent printed, price 4d. No Drawings.]

A.D. 1754, May 21.—N^o 690.

LEWIS, JOHN. — Preparing from the American pitch pine
tree a varnish of pine for paying ships' sides and masts.

According to this method common “plantation tar” is
distilled with “one fourth part of clean water,” and the product
of the distillation is mixed with “fine claryfied turpentine,”

M.

A

from which all the "acid watery particles" have been evaporated, in the proportion of 15 cwt. of turpentine to 10 cwt. of the prepared oil.

A still for the purpose is specially described.

[Printed, 4d. No Drawings. See Rolls Chapel Reports, 6th Report, p. 123.]

A.D. 1775, November 22.—N° 1108.

MILLER, SAMUEL.—Windmill for propelling ships and for other uses on board ship.

Four windmill sails are fitted in the usual manner on a frame on the deck. On the shaft revolved by these sails is a pulley from which by means of an endless chain motion is communicated to a second pulley below. A toothed wheel on the shaft of the second pulley is thrown into gearing alternately with each of two wheels, by which a reciprocating motion is given to a quadrant. Thence by an endless rope over two rollers a vibratory motion is given to a pair of oars projecting backwards from the vessel's stern.

On the end of each vane is a "flat piece of iron inclined " Forty-five degrees which cut through the water " in a manner not further described.

Each sail is "concave six inches on each side, convex fifteen inches at the upper end. It is stretched on a "yard" supported on a central arm. It has a reef and a "tie" or halliard to hoist it.

A means of working a pump by the apparatus is described.

[Printed, 10d. Drawing.]

A.D. 1782, May 2.—N° 1329.

SAUNDERS, EDMUND.—"A new-invented mixture or composition," "called naval black varnish, to be used in paying " the yards, topmasts, bowsprits, bends, blocks, anchors, &c. " of ships, instead of tar and lamp black, which had been " generally hitherto used for those purposes."

The inventor says :—

"Take any quantity of the finest and blackest Stockholm tar " you can pick out of your stock, distil it chemically as long " as it will bear running without catching fire, which must be " carefully attended to lest you set the still house on fire. " This distillation produces a quantity of oil and water, the

“latter of a very corrosive nature, and very injurious to timber or cordage; the residuum is drawn off hot and put into a furnace, and to this such a quantity of the above oil is put as will bring it to the consistence of thin treacle or molassus; but here note that the oil should stand in fatts upon pieces of iron steep’d in it from three to six months, the longer the better, as the air meliorates it and the iron stains it. To this part of the composition is added what I call black barilla, which is made after this manner, viz. :— put about two thirds tar and one third pitch into an iron furnace, set it on fire and let it burn as long as it will; this when cold is to be powdered and sifted, or melted, and about half a hundredweight mixt with the mass, as to make in all about a hogshead, to which put as much ivory black as will bring it to a fine colour, and according to the purposes for which it is wanted in the Royal Navy, agreeable to the officer’s direction. I make it thicker or thinner by the proportion of said oil. It may be used in all weathers without heating, with a painting brush. Note, the cask from whence taken should always be well stirred, as the heavy parts fall to the bottom.”

[Printed, 4d. No Drawings. See Rolls Chapel Reports, 6th Report, p. 166.]

A.D. 1789, December 12.—N^o 1718.

DELOLME, JOHN LEWIS.—Ship building, &c.

The only part of the invention relating to the present series is thus described :—

“In order to enable the vessel to sail with few points of wind, the sail should be fixed to two yards parallel to each other, by which the disadvantageous hollow spherical figure or pouch exhibited by the sails of common sailing vessels is avoided. The sail should be divided into two parts, in order that the mast may make a free passage between them when the vessel is passing to an opposite tack, by which the turning of the sail round the mast will be needless. The lower yard should be forced within two rings rivetted to each end of an iron bar,” “and this bar should be fixed either by rivets or by screws to a hollow tube fitted to and turning round the mast. One or two hooks should be fixed to the end of this tube, which hooks should be made to

“ grasp exactly a circular plate immoveably fixed to the mast.
 “ Around this immoveable plate the hooks will turn, together
 “ with the yards and sail when necessary, without moving
 “ either upwards or downwards. A hole should be made in
 “ the middle of the lower yard, and a stick should be fitted to
 “ this hole in the shape of the handle of a vice, by which this
 “ lower yard will be turned round within the rings, and the
 “ sail thereby furled up. A sail so fitted and divided may be
 “ either square or triangular, with the point or shorter yard
 “ at top.”

[Printed, 1s. Drawings.]

A.D. 1790, October 29.—N° 1779.

LUSCOMBE, MATTHEW.—“ A new improvement on a com-
 “ position called naval black varnish, for paying yards, masts,
 “ blocks, and bends, anchors, &c^a of ships.”

In a still capable of containing about nine hundred gallons,
 says the inventor, “ I place as much thin iron as it will con-
 “ veniently hold, with eleven to fourteen barrels of choice
 “ Stockholm tar, and about four hundred and thirty gallons of
 “ oil of tar ; thus prepared, the distillation is begun, and the
 “ first day from sixty to one hundred gallons of the fine oil
 “ mentioned in the patent is extracted, and so on from day
 “ to day, until the varnish be a fine japan black in colour and
 “ in size for masts, yards, &c^a, of a fine thin tar for bottoms
 “ &c^a, until it be stout, when cold, as you can just penetrate
 “ with your finger. If it be found after it is brought to a
 “ proper size, that it be not sufficiently black, from not having
 “ imbibed a proper quantity of iron,” more oil of tar must
 be put in the still and the process continued, until it becomes
 perfectly black.

[Printed, 4d. No Drawings.]

A.D. 1799, November 4.—N° 2349.

LONSDALE, WILLIAM.—Weighing anchors, steering, reefing
 sails, &c.

Among other improvements some windlasses are described,
 and the Specification proceeds :— “ These rollers may be
 “ applied to sheeting home sails, as also reeving them in
 “ *the following manner* to have as many sheeves in each yard

“ arm as there are reefs in the sail ; these sheeves have
“ catchpoles in them, and the earings or reef tackles have
“ knots or mouses wrought upon them to stop and hold them
“ fast when the reefs are hauled out. The reef tackle must
“ be in length according to the depth of each reef, with one
“ block on each quarter of the yard, thro’ which blocks
“ runners or ropes must be reeved, in order to hook the reef
“ tackles above the yard. These runners being hooked to the
“ reef tackles, and the ends of which made fast to the wence
“ or roller, one man will haul both earings out and the catch-
“ poles will secure them at the same time the sails are clewing
“ down.”

[Printed, 4d. No Drawings. See Rolls Chapel Reports, 6th Report, p. 196.]

A.D. 1799, November 4.—N° 2350.

GOWER, RICHARD HALL.—“ System of naval architecture and
“ rigging of vessels.”

In the first part of the Specification a new form of hull is described.

The sails on the fore-mast are square and like the sails of a ship, but the cross-trees are placed nearer the head of the lower-mast, and may in small vessels play round a pivot fixed in the centre of the lower mast-head ; the fore-yard is over the fore-stay, which is made fast to the stem, and has no connection with the bowsprit ; also, the fore-sail hoists up to the fore-yard, and has a gore cut out of it amidships to receive the fore-stay. It is sheeted home to a yard below.

The sails on the after-masts, of which four are shown in the drawing, are fore-and-aft sails. “ The head-sails are confined
“ to their positions by braces and bowlines, as in a ship, and
“ the after-sails are confined by ropes leading from amid-
“ ships.” “ The topmasts are made to fit on one side of the
“ lower masts.” The course has two sprits, an upper and a lower, by bearing upon which the sail is stretched flat. The top-sail and top-gallant sail have each a sprit. Ribs of canvas are laced over the sprits to prevent the sail from “ bagging ” when the sprit is to windward. Full directions for setting the sails are given.

[Printed, 10d., Drawing.]

A.D. 1800, June 17.—N^o 2415.

SMART, GEORGE.—Making hollow masts, &c.

The invention is applicable to “masts, yards, bowsprits, and “ other hollow timbers.” A spar is divided down the centre into four quarters, and planks are mortised into these so that a tubular column is made. Any length may be obtained by joining on spars or planks [by scarph joints, or where the breadth is sufficient to admit of more than one plank being employed, the planks may be bolted together, the joints being made to overlap one another. The mast, &c. is bound with hoops. To give additional strength, cross pieces or braces may be placed within the tube, and mortised into the sides. A method is also shown in which a mast is built up merely of planks “fayed on the edges and hoop’d.”

It is intended that the top-gallant-mast should slide into the top-mast and the top-mast into the lower-mast.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 14, p. 17.]

A.D. 1801, October 30.—N^o 2546.

BRAYSHAY, RICHARD, and McMAHON, WILLIAM.—“Ma-
“ chine for the purpose of gaining an increased speed and
“ power to all mechanical operations.”

Amongst other apparatus for use on shipboard a sort of windmill is described by which power to drive oars is obtained. The sails are made of canvas. They are set on a wheel with two series of arms radiating from a central shaft either vertical or horizontal. Each sail is stretched between two of these arms so that a vane wheel is formed. The arms may be telescopic to increase the power of the sails. The sails “are
“ so contrived as to be able to play in a given space, being
“ fixed perpendicularly on the wheel, and fastened by a cord
“ or otherwise, so that when the wind blows from any quarter,
“ three fourths of the sails catch the wind, and by forcing the
“ wheel round, those sails which are forced against the wind
“ come up edgeways.” Also there may be “two sails together,
“ opening as it were a book.” These are opened by the wind pressing upon them, but yield when coming up against the wind.

Motion is conveyed from this apparatus to oars.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 1 (second series), p. 11.]

A.D. 1802, February 19.—No 2581.

PENNECK, HENRY, and DUNKIN, ROBERT. —Sails, bowsprits, &c.

Square sails are improved “by forming the leeches of such convexity or other proper figure that their bolt ropes shall not be tighter than necessary to preserve the sail and to allow it to produce” the proper effect. To the leeches thimbles are affixed, and a rope fixed to the yard arm passes through these thimbles, by which the leach is drawn tight. When the sail is close hauled, the weather leach is tightened and the lee leach slacked off. By hauling both ropes tight, the sail is made to bag.

Two fore-and-aft sails are described. In one the mainsail and foresail of a cutter are made in one. “The mainsail part may be extended by a gaff, and is used with or without a boom.” “When close hauled the greater part of the sail hangs to leeward of the mast and the tack is brought up on the windward side, and in tacking changed to the opposite side by hauling it round the mast over rollers, during which the weight of the fore part is supported by brails fixed to the foot rope. This sail requires bowlines, and may be reduced by brailing the fore part to a reef band sewed on the sail in the sweep required, which may then be attached to the mast, and the tack fixed below, as usual.” This sail is used chiefly on the mizen masts of ships.” The second sail is a lug sail split down the middle. The method above described of tightening the leach may be used with this sail.

The bowsprit may turn on the fore-mast like a cutter’s gaff. It traverses on rollers on the gunwale or otherwise. It is held in position by tackles on each side, and when it is required to be shifted, the tackles on one side are slacked off and the others hauled on. The end of the bob-stay is fixed to a slide which works in a groove. Near the heel of the bowsprit an iron bend fits over it which is bolted to the deck. It is secured to the stem by iron hoops fitting over knees which are moveable. The knight-heads are moveable. The main-stay is made fast to the stem. “The upper ends of the foremast and foretopmast stays terminate in blocks near their mast heads, that work on collars over the parts on which the stays are usually

“ placed, which should plumb the part on which the bowsprit
“ turns.”

An improved compass is also described.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 1 (*second series*),
p. 325.]

A.D. 1803, August 30.—N^o 2733.

DEMPSTER, CATHCART.—“ Canvas or strong cloths of vege-
“ table materials, for sails, tents, packages, and other useful
“ purposes.”

The following is the whole Specification :— “ Instead of
“ using single yarns not twisted but glued together with
“ starch or other mucilage, in order to form the warp of the
“ canvas, as is now commonly done to the great injury of
“ the article, by rendering it liable to spontaneous destruction
“ by mildew, I use twine composed of two or more yarns of
“ prime material of equal size and strength, both for the warp
“ and woof, and I am by that means enabled to weave, and
“ I do weave my canvas without starch or any other mucilage
“ whatever, and do thereby produce an article nearly twice
“ as strong as common canvas of the same weight and fine-
“ ness, and with the advantage that its threads have an equal
“ bearing on one another in all directions, not liable like the
“ common canvas to split longitudinally, being much stronger
“ in the cross direction, not capable of rot or mildew from the
“ presence of mucilage, and extremely durable, because it is
“ subject to no irregular action of sharp cutting threads on
“ its woof, but is only exposed to the fair, slow, and gradual
“ wear of its well combined and duly proportioned component
“ parts, which maintain their relative strength to the last.”

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 5 (*second series*),
p. 99; Carpmael's Reports on Patent Cases, vol. 1, p. 420.]

A.D. 1804, January 19.—N^o 2748.

SLATER, JOHN.—“ Cables, shrouds, stays, and other articles
“ for the rigging of ships.”

The inventor says :— “ My invention consists in the sub-
“ stitution of metals in lieu of hemp in the fabrication of
“ cables, shrouds, stays, and other articles for the rigging of
“ ships, which is to be applied in the form of chain-work, and

“ which every workman in chain-work knows how to make
“ without further instructions. N.B.—I claim no discovery
“ in the construction of chains, but solely to the application
“ of them for the purpose of rigging ships, of whatever form,
“ metal, or metallic substance they may be constructed.”

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 6 (second series), p. 3.]

A.D. 1804, September 21.—N^o 2785.

SCARTH, MICHAEL.—“ Manufacturing sail cloth with single
“ or double thread warp, without starch or any substitute for
“ stiffening, and without the double threads being twisted
“ together.”

The improvements consist in “arranging the yarn of the
“ warp in such a manner that most of the loose ends of the
“ fibres of each thread point towards the yarn beam.” By
“ loose ends” is meant such as “are not covered by other
“ fibres” and “are left projecting from the thread.” The
inventor proceeds “I warp the number of threads necessary
“ for a bolt or web by drawing out the threads to the length
“ required in one continued length, or upon a common warping
“ frame or machine. When the number of threads drawn out
“ at one time is not sufficient, I cut them at the proper length
“ and repeat the operation until the requisite number is
“ obtained; or instead of cutting the threads, as last described,
“ I warp two lengths together by continuing the threads back-
“ wards and forwards, or by reversing the motion of the
“ warping machine, keeping the threads in each direction
“ distinct, and after the requisite number is obtained I cut the
“ same into two warps at the turnings. When the yarn is
“ spun in long sheds and lain into warps without the threads
“ being reeled or wound up, I spin each thread of the entire
“ length required for a warp without any splice, which length
“ is about fifty yards for a bolt of sail cloth of about thirty-
“ eight yards long; and in beaming each warp for weaving,
“ that end which I wind first upon the yarn beam is the end
“ towards which the loose ends of the fibres point, the threads
“ at the other end of the warp being afterwards drawn through
“ the harness and slay.”

[Printed, 4d. No Drawings. See Rolls Chapel Reports, 6th Report, p. 203.]

A.D. 1805, June 11.—N° 2857.

COWAN, MALCOLM.—Sails.

Sails are made with the seams horizontal instead of vertical. They reef at the foot instead of at the head, but may also reef at the head if required. There is a reef-band sewed on the sail; it is roped at the lower part and sewed above. To this the buntlines are rove. There are also "gaskets, rove occasionally as a reef line in separate pieces, through eyelet holes under the reef bands, and made fast to the middle and quarters of the sail for confining the slack sail when reefed in the wake of the reef bands and quarters."

"An awning sail of a lugger or brig" is shown in the drawing "set vertically under a small main sail."

[Printed, 6d. Drawing. See Repertory of Arts, vol. 9 (*second series*), p. 88.]

A.D. 1806, August 22.—N° 2959.

BYWATER, JOHN.—Sails for ships, &c.

For reefing sails, a roller is attached below the yard. It rests in sockets at the ends of the yards, and is supported by friction rollers on the mast. On this roller the head of the sail is fastened so that it may be rolled upon it. At its ends are enlarged pieces, so that a rope wound thereon has increased leverage. To reef the sail, the yard is lowered (the sail being kept full) and by hauling on the reef lines the sail is wound on the roller. In the courses, the tacks and sheets are eased off, and the sail rolled up as before. By this means about half the sail may be reefed; the rest is "handed as usual."

For "doubling or folding" a strong reef band is fixed across the sail, and a rope like the head-rope attached thereto. To earings at the end of this rope "outer reef lines" are attached, and at intermediate points along it other lines are fixed to it which are led through blocks on the yard down to the deck. To reef, the outer reef lines are hauled taut, the yard is lowered (or in the courses the tack and sheet let go) and the other reef lines hauled home. To prevent the part of the sail thus doubled and hanging down from "shivering" when the vessel is close-hauled, "reef sheets" are attached to cringles in the leach ropes where the doubled part is, and these are led with

the sheets to the deck. Any required number of reef-bands, &c., may be employed.

[Printed, 6d. Drawing. See Rolls Chapel Reports, 7th Report, p. 193.]

A.D. 1806, August 30.—N° 2964.

WILSON, CHRISTOPHER. — “New system of naval architecture.”

Part of the invention relates to a method of joining timbers by mortise keys driven from inside to outside in the joints, and diagonally across the joints on the outer surface. Amongst other applications the drawings show “four pieces united forming a spar or rough mast fit for a mast maker.” The mast may be “lengthened to any extent by scarfing one of the pieces at a time” especially by a “double scarf” figured.

[Printed, 1s. 8d. Drawings. See Rolls Chapel Reports, 7th Report, p. 192.]

A.D. 1808, February 4.—N° 3107.

BROWN, SAMUEL.—Rigging for ships, &c.

The invention consists in employing metal instead of cordage for the standing rigging. For this purpose a series of iron rods (or rods of other suitable metal) are joined by eyes, welded into one another. At suitable distances are “ess hooks or shifting shackles” to allow of a fresh length being substituted for a broken one. The shrouds abreast of the mast are formed of one continuous length of the iron rigging, working over blocks above and below, short lengths of chain being fitted to work in the blocks. By this means the strain is equally divided among the shrouds. To prevent the whole coming away if one shroud broke, each shroud is secured with a “stopper” hooked rather slacker than the rigging, which takes the strain of the shroud if the one next it breaks. The after shrouds are separate but are secured in a similar manner.

To provide some degree of elasticity, the rigging is “girt in with tackles below the catharpins.” The tackle folds lead down the mast and have weights hung on them, so that the rigging is kept taut but allowed a little play.

The main-stay is set up in a similar way and has a weight hung on it from a tackle which draws in the bight as it slackens, and eases it off as it grows taut.

The rigging may be used as a lightning conductor, a rod being carried from the chains down to the water. It should be

coated with an anti-corrosive composition, and covered with parcelling or served with spun yarn.

A chain cable is also described.

[Printed, 10d. Drawings.]

A.D. 1808, October 31.—N° 3173.

VAN WART, HENRY. — (*A communication from Isaiah Jennings.*)—Machine for manufacturing ships' thimbles.

A weighted hammer is jointed to a frame in such a way that it may be raised by a cord connected to a treadle, by a wheel, or in any other suitable manner, and allowed to fall by its weight on an anvil below. The hammer works between guides, and springs may be used to assist the action of the weight. The anvil is shaped to correspond with the form of the thimble, as is also the face of the hammer, and the thimble is formed from "a piece of flat rolled iron," heated and held on the anvil. The anvil is of the sort "called a stake or back horn."

[Printed, 4d. No Drawings. See Rolls Chapel Reports, 7th Report, p. 107.]

A.D. 1809, April 29.—N° 3231.

TREVITHICK, RICHARD, and DICKINSON, ROBERT. — "Improvements calculated to improve naval architecture and navigation."

One part of the invention, according to the description of the inventors "doth consist in making masts, bowsprits, yards, and booms, of wrought iron, out of plates rivitted or screwed together in hollow or tubular forms. These masts being hollow tubes, the upper masts may be made to slide into the lower mast, as the inner tubes slide into the outer tube of a pocket telescope, or they may be struck exactly in the same manner as the wooden masts are at present, but we prefer the former method, because, by making the masts in a sufficient number of sliding pieces, the whole may be lowered by means of ropes and pullies successively, till all be as low as the deck; an arrangement which affords to a ship in the case of a storm that advantage which is endeavoured to be obtained by cutting away masts made of wood. When the storm is over, these masts may be raised again to their first situation and original utility

“ with great ease. The bowsprits, when so wanted, may also
 “ be made in sliding pieces like the masts.”

[Printed, 4d. No Drawings. See Rolls Chapel Report, 7th Reports, p. 204.]

A.D. 1813, April 13.—N° 3682.

CAMPION, ROBERT.—“ Manufacturing double canvass and
 “ sail cloth with hemp and flax or either of them, without any
 “ starch.”

The invention “ consists in first spinning the warp yarn
 “ either by hand or with the sort of machinery generally
 “ used for such purposes, without water or dampness of any
 “ kind whatever, afterwards properly cleansing and bleaching
 “ the same in the best manner, and having made it perfectly
 “ dry from that process, placing and working it on a machine
 “ similar to those commonly used in cotton manufactories,
 “ round the upper bobbins of which machine the same is
 “ rolled in single threads, so as that when the said machine
 “ is put in motion in the usual manner, the effect thereof is
 “ to untwist those threads and take out of them all the twist
 “ that was made therein by the operation of spinning, and to
 “ twist or interweave two of them into one thread on to half
 “ the number of other bobbins in the lower part of the said
 “ machine the reverse or contrary way to that in which the
 “ single threads or warps had been before twisted.” When
 hemp is used, the inventor hackles “ the same with soft soap
 “ and a very small proportion of oil, in preference to the
 “ entire use of oil.”

The advantages of the invention “ of course extend to can-
 “ vass made of unbleached yarn, and the only difference in
 “ the manufacture thereof is the process of bleaching being
 “ then dispensed with.”

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 25 (*second series*),
 p. 12; Webster's Patent Law, p. 86; also p. 130, case 72, and Supplement
 p. 23; Webster's Letters Patent, pp. 23 and 59; Billing on Patents, pp. 45,
 50, 90, and 109; Holroyd on Patents, p. 90; Carpmael's Reports on Patent
 Cases, vol. 1, p. 418; Broderip and Bingham's Reports, vol. 3, p. 5; Bayly
 Moore's Reports, vol. 6, p. 71; Patentee's Manual, p. 74.]

A.D. 1814, July 26.—N° 3827.

DONCASTER, WILLIAM.—Ship-building, &c.

A “ hydrostatic ship ” is described. It is stated that “ the
 “ best way of employing the surface for impulsion which the

“ deck affords will be by the use of horizontal sails, which
 “ act with the wind in any direction ; the pressure of the
 “ ship’s motion against the atmosphere will thus serve to give
 “ them an artificial impulsion besides the one they derive
 “ from the actual direction of the wind.” It appears that
 these sails are to assist in the hydraulic propulsion of the
 ship, but no description is given of the way they are to act.

In another part of the Specification it is stated that there is
 to be a vertical sail and a horizontal sail. The sails are
 suspended from rings on an iron frame. The sail cloth is of
 double thickness. “ To elongate the sails a windlass and
 “ barrel must be used.” There are also sails which “ being
 “ originally formed to fold up like a pair of regimental
 “ colours, will probably be best worked by a capstan below.”
 “ The intention of them was that they should be fastened
 “ round the supporters of the horizontal sails,”

[Printed, 8d. Drawing. See Rolls Chapel Reports, 8th Report, p. 106.]

A. D. 1818, May 9.—N^o 4260.

ECCLES, ROBERT.—“Masts, sails, and rigging of ships and
 “ sailing vessels.”

The object of the invention is to adapt the fore-and-aft rig to
 large vessels. There are two “ slender masts,” and two “ stan-
 “ dards ” one from the foot of the mizen-mast to the head of
 the main-mast, and the other from the foot of the main-mast
 raking forward over the bows. The head of the mizen is
 connected to the head of the main-mast by a spar, and the
 head of the main-mast is similarly connected to the fore
 “ standard,” which also has a spar connecting it with the bow-
 sprit. Shores are placed to support the masts and “ standards ”
 and there are also stays for the same purpose. On each side
 of the mast is a “ wooden shroud ” besides three of rope. The
 latter have on them small hoops which fit over the wooden
 shroud. On the main-mast is a short yard. The masts may
 be spliced. A top-mast of the sort usual in cutters may be
 used. The sails are triangular and there are no gaffs. The
 “ middle sail ” and mizen have booms and there are two sprit-
 sails set on the “ standards.” The feet of the sprits traverse
 on the mast “ in the manner that booms do.” The main and
mizen-sails have hoops which travel on a spar or rope along
the mast, instead of on the mast. To reef the sprit-sails the

upper part is hauled down to the sprit and reefed to it. There is a yard on the main-mast on which are set two triangular sails. There are also "outer angle sails" "boomed out from below by booms which are to traverse on a bolt or pivot attached to the sides of the vessel near her bows, in the manner at present used by ships for their lower steering sails."

The spars of which the "wooden shrouds" and "stays" are made are connected by iron bolts and eyes, or may be nailed together.

Instead of the masts above described a pair of shears may be used.

[Printed, 1s. 6d. Drawings.]

A.D. 1820, May 15.—N° 4461.

BILL, ROBERT.—Ships' masts, yards, &c. and rigging.

The first part of this invention relates to constructing masts, yards, and bowsprits of iron or other metal. They may be made in various ways, as by forming the metal into a tube, or by rivetting together standards of T or other shaped iron and surrounding them with iron plates, or by fixing iron plates upon uprights of wood. Cross braces may be employed within the mast to strengthen it, and the inventor prefers to use the mast as a means of ventilation by making suitable openings in it, supporting it where the openings are to avoid weakness.

The second part relates to the use of a composition, $\frac{3}{4}$ "well boiled mineral stiff tar" and $\frac{1}{4}$ turpentine for the ropes, rigging, &c.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 1, p. 387; *Mechanics' Magazine*, vol. 3, p. 432.]

A.D. 1822, February 5.—N° 4644.

BILL, ROBERT.—"Masts, yards, booms, bowsprits."

The first part of this invention consists in constructing masts, &c., of iron tubes, within which hoops of angle iron are fixed to give additional strength. Larger masts are made of plates rivetted together with hoops, or portions of hoops of iron within them.

According to the second part, iron chains are substituted for ropes in the standing rigging. These chains are made of solid flat links, bored at the end to admit of their being rivetted to

short connecting bars, and bent half way round, so the play of the two joints may be in planes at right angles to each other, and the chain be thereby rendered flexible in all directions.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 4, p. 179; *Mechanics' Magazine*, vol. 3, p. 432.]

A.D. 1823, August 18.—N^o 4831.

ROGERS, ROBERT.—“Improved lanyard.”

The improved lanyard consists of “an iron frame having “two parallel sides united at top, and joined below to a socket “with a hole through which a bar” passes with holes in it to receive a catch so that the shrouds can be secured when they are drawn taut.

For setting up the rigging, two hooks are set in sockets connected by a screw, so that they can be drawn together and the shrouds, &c., tautened.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 7, p. 288.]

A.D. 1823, August 21.—N^o 4839.

ROTCH, BENJAMIN.—Fid.

The improved fid consists of a pair of levers, so arranged that the heel of the top-mast rests on their shorter arms. Two ways are described in which these levers may be kept in their place, (1) by a pall, (2) by a bolt.

The levers are opposite one another. Each works on a pivot in a “carriage” fixed to the head of the lower-mast. The short arm of the lever projects sufficiently to form a resting place on which the heel of the mast is supported. When the longer arm is raised, the short arm drops, and allows the mast to be lowered. To keep the lever in position, a pall is pivotted on the lower side of the lever, and this is forced against the back of the “carriage” by the weight of the mast when fidded. To unfid the mast, the longer arm of the lever is hauled upon by a purchase, and the pall can then be raised by a bar passing through a slot in the lever. The long arm is then let go, the short arm drops and the mast is lowered.

Instead of a pall as above, the lever may be secured by a bolt passing across it through slots in the sides of the “carriage” and in the lever.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 1 (*third series*) pp. 6⁹ and 51; London Journal (*Newton's*), vol. 9, p. 177; Register of Arts and Sciences, vol. 2, pp. 233.]

A.D. 1823, December 13.—N^o 4880.

HEATHCOTE, SIR HENRY.—Stay-sails.

The invention consists in a particular method of shaping stay-sails, which it would not be easy to make clear without a drawing. A "side elevation of the masts and yards" is to be drawn, and certain lines laid down thereupon by which the size and shape of the sails are to be determined. The following stay-sails have full descriptions and directions given for planning them out. Main-topmast, main-top-gallant, main-royal, main-top-mast auxiliary, main-top-gallant auxiliary, main-royal auxiliary, main-top-gallant, mizen royal. Each "principal staysail except the main-topmast staysail" is fitted "with a running or veering tack." "The main-topmast staysail and all the auxiliary staysails are fitted in the same manner as ordinary staysails."

The auxiliary stay-sails above-mentioned are to be used above each of three principal staysails."

The object of the improved form is to lessen "the effect of the back wind which escapes from staysails as they are now formed and rigged."

[Printed, 6d. Drawing. See Repertory of Arts, vol. 45 (second series), p. 78 London Journal (Newton's), vol. 8, p. 225.]

A.D. 1824, April 15.—N^o 4943.

TONGE, DANIEL.—"Reefing sails."

The top-sail is divided into two parts called the "topsail head" and the "topsail foot." There is an additional yard between them to which both sails are secured. The "topsail head" has no sheets, but is fastened fast to this yard. Across the "topsail head" are bolt ropes, at convenient distances for reefing, and corresponding reef pennants are affixed thereto. To reef, the upper yard is lowered away till one of the bolt ropes is on a level with the additional yard, or until the upper half sail is entirely behind the lower half, the reef pennants are hauled down and the sail is thus reduced.

Instead of reef tackles, reef points in the head of the "top-sail head" may be employed.

[Printed, 6d. Drawing. See London Journal (Newton's), vol. 9, p. 383.]

A.D. 1824, July 7.—N^o 4985.

HIGGINS, JOHN LANE.—“Masts, yards, sails and rigging.”

A fore-and-aft sail is described “the tack head and peak “being an arc or equidistant from the end of the boom,” that is to say, the sail is shaped like a quarter of a circle. The head of the sail is attached to a curved yard, the end of which is fitted to travel up and down a rope passing from the mast-head to the forward end of the boom. To this rope the tack of the sail is attached by cringles or lacing so that it may slide thereupon. To reef the sail the halliard is let go, and the sail reefed in the usual way, except that the lines of reef points lead in the direction of radii of the circle of which the sail is a segment, so that the sail is taken in at the tack, and hardly at all at the leach. A rope may be stretched from the peak to the boom end to keep the leach of the sail flat.

“Double masts or shears” may be used which have the sail between them.

The bowsprit may be affixed to the boom or the two may be in one piece. Or the bowsprit may work “by a swivel on a “short boom at the stern [stem?] of the vessel, the after end “working on a traverse on the deck by tackles.”

The boom may be double, “hooped at each end,” and may work “on each side of the mast.”

A new top-sail is described. “The yard on which the sail is “bent is slung at the middle, and hoisted by a halliard through “a block at the mast head. A small rope at each end of the “yard keeps it perpendicular, and by letting go one rope and “hauling on the other, the sail is always kept on the weather “side of the gaff for the purpose of conducting the wind into “the main sail.”

In two masted vessels the fore and main sheets are “all one “rope, the middle of the rope being passed round a wheel in “the middle of the vessel.” In ships the fore and mizen sheets may be similarly connected.

In ships “the foot of the jib shall be made fast to each end “of the jibboom” which works on a swivel on the bowsprit or on a boom rigged out at the end of the bowsprit for the purpose. “The two topmast stays must be kept apart by a cross- “piece at the end of the bowsprit, and continue down to the

“cutwater like bob-stays, the jibboom being made double”
 “and having a foot rope rigged along it for the jib traveller.”

[Printed, 10d. Drawing. See Repertory of Arts, vol. 1 (*third series*), p. 463;
 also vol. 2 (*third series*), p. 187; London Journal (*Newton's*), vol. 10, p. 234.]

A.D. 1824, November 4.—N^o 5028.

GUPPY, THOMAS RICHARD.—“Masting vessels.”

“Double pole masts” formed like shears are used instead of the ordinary mast. The two poles are pivotted one on each side of the vessel, and joined together at the top by a mitre or scarp joint or otherwise. “Many ways will suggest themselves to the ingenuous mast maker for scarping or mitreing the heads of the two poles together.” The upper ends of the poles may cross, and form a support for the top. At the point where they join a strong iron band is fixed over them. This band has a “bowed front” to receive the bed of the topmast, which may be supported by an ordinary fid or a “patent lever fid.” Fore-and-aft stays will be required, and by them the mast may be lowered to serve the purpose of shear-legs when necessary. The other rigging may be of any sort preferred. The sails may be square or fore-and-aft.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 2 (*third series*), p. 185;
 also vol. 3 (*third series*), p. 261; London Journal (*Newton's*), vol. 11,
 p. 308; Register of Arts and Sciences, vol. 4, p. 309; Engineers' and
 Mechanics' Encyclopædia, vol. 2, p. 132.]

A.D. 1824, November 25.—N^o 5043.

BURNETT, WILLIAM SHELTON.—“Ships' tackle.”

A helical spring is fitted in a tube so as to rest against stops at the ends. On one end of the spring is a sliding plate, and to this a sliding rod is affixed, so that any strain applied to rings at the ends of the apparatus is taken by the spring. The spring may be fitted to shrouds, stays, &c.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 11, p. 345;
 Register of Arts and Sciences, vol. 4, p. 152.]

A.D. 1825, January 11.—N^o 5073.

ATLEE, JAMES FALCONER.—“A process by which planks and other scantlings of wood of every description will be prevented from shrinking, and will be altered and materially improved in their durability, closeness of grain, and power of resisting moisture.”

“The plank or scantlings of timber to be operated upon must first be reduced by sawing, planeing, or other usual and known means into pieces, having two of their opposite sides parallel to each other so as to produce as nearly as may be equal thickness in the piece throughout, or from one end to the other, and being so prepared” they are passed “between a pair of highly polished cast-iron or other metal cylinders in the nature of a flattening mill or rolling press.” “The piece of wood or timber to be condensed must be passed many times between the rollers, taking care to increase their proximity and consequent pressure at each time of passing the wood or timber, and to produce this increasing pressure by very slow degrees, when it will be found that the sap or other moisture previously contained in the wood will exude in very considerable quantities from the ends of and sides of the piece, and that it will give way and condense in its thickness without any tendency to disturb the natural grain or texture of the wood.” “Wood so condensed becomes much heavier and harder than similar wood without such treatment, and is consequently less pervious to moisture,” “less liable to decay, much stronger,” “has the important advantage of not shrinking by becoming dry or heated,” &c.

It is preferred to use a number of pairs of cylinders, so arranged that each pair is set closer than the pair before it, and the wood passing through them in succession receives a continually increasing pressure.

For making dowells and trenails, the wood after being compressed as a plank is reduced to a cylindrical form and finished by forcing it through tapering holes in a steel plate.

Reference to this Specification is made in No. 5593, A.D. 1827.

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 1 (*third series*), p. 116; London Journal (*Newton's*), vol. 11, p. 91.]

A.D. 1825, July 8.—N° 5205.

SHULDHAM, MOLYNEUX.—Sails and rigging of boats and ships.

A mast may be pivotted in a step secured to the kelson of a boat, and work in a collar on the thwart. The lower portion of the mast may be formed of iron, and be connected to the upper part by a hoop covering the joint. The drawing of this

boat represents it with a lug sail having a boom. The boom is pivotted to the mast, so that it can be turned up and lashed to it for convenience of stowage. The halliard is attached in the usual way, and the sheet is led through a block fixed amidships and thence to a cleat.

A similar pivot may have on its top a cross, from the four arms of which four poles ascend to form a mast. The boom is pivotted over the centre of the cross. The poles are firmly mortised at their ends to the arms of the cross, and are united at the top. The halliard for the yard is led through a block attached to the junction of the poles. For working the sail a grooved wheel is fixed below the cross. Round it passes an endless band which goes through two blocks one on each gunwale. By this "the vessel may be wore without the necessity of jibing the sail; but in tacking or working to windward, the sail must be held by a sheet attached to the boom."

With a lateen sail the poles may be inclined forwards. The yard and boom are fastened together by a bolt.

The boom may form one half of the cross, and there may be three poles only, one of which may be fixed to the forward end of the boom, and the other two to the ends of the cross-piece. Braces may be fixed to the cross-piece from the ends of the boom. The ends of this cross-piece slant upwards "to prevent the sails from dipping into the water." Bars may be fixed across to connect the arms of the cross-pieces. The top-mast is fixed to the top of the "fore pole." It has a "cross-piece" or spreader. The three poles are fixed to a wooden block. The sail "partakes of the nature both of a mainsail and a foresail, the fore leech being attached to the fore pole by hoops." The jib may be double "and the after leech of each jib locks in on each side of the mainsail." By this means it is possible "to open either side of the double jib" "for the purpose of laying to or paying the vessels head off." By the complete revolution of the mast and sails, it is possible "to dispense with the square sail commonly used in cutters when going before the wind." This rig may be used for a schooner "the main mast differing in not having a jib, and there being no boom before the fore pole." The masts may be worked by tackles to the arms of the crosses, or by an endless band as above.

For larger vessels, instead of the masts being pivotted to a step, they may be fixed on a bed-plate of wood and iron working on rollers.

In a brig rigged according to this invention no bowsprit is required. There are no jibs or stay-sails, but the square sails are larger to compensate for their absence. Each mast works independently of the rest, and the sails work themselves "in the manner of a wind vane." The cross-trees are fixed to part of the top-gallant-mast, and the top-mast passes through a hole in them and is secured by a fid. The shrouds are affixed to the cross-trees and consequently come down with the mast. The cross-trees "are placed at similar angles with the poles." The yard may be "affixed to cross-trees." Below the junction of the poles cross-pieces are affixed, and to these the lower yard is slung. The sails are cut so that "all the goring may be in the fore leech," so that the "square sails" are made "on the principle of 'lug sails.'" In the foot of each top-sail and top-gallant sail "a notch or gap" is cut, which allows the sails "to clear the top and topmast head." The top-sails are made "on the principle of latteen sails." A ship is rigged in the same way as a brig, "with the addition of a mizen mast."

If the masts or shears are too long to be made of a single pole, two poles may be connected by "hoops or caps."

"Diagonal braces" may be used "to extend the foot of the sail without a boom."

For reefing the sails "a flat or oval tapering reefing board" is affixed to the foot of the sail. By revolving this the sail is wound upon it and reefed. The board is secured by pins fitting into stanchions on the boom, to which the board is pivotted, or by a rack and pall. Instead of a single board, a framework of boards may be used. The board may be revolved by hand, or by a spring, or by a weight on a line rolled upon it. To make the sail roll evenly on the board, flat bands of a suitable material are sewn upon it. Instead of bolt ropes similar flat bands are used.

A lateen topsail may be set on a lug yard without any topmast, the lower end of the lateen yard being made fast to the free end of the lug yard.

A "ring tail or studding sail" may be added to a lug. It is cut so as to fit exactly to the sail to which it is to be added and

laced to it, by a series of loops "in the manner frequently applied in looping the legs of pantaloons," or by staples on one sail which pass through eyes in the other, and have a string run through them.

The poles forming the mast may be hinged, so as to fold down into the vessel and be raised again by a tackle.

The revolving base for a mast may be applied to all sorts of masts besides those above described.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 2 (*third series*), p. 74; London Journal (*Newton's*), vol. 12, p. 16; Mechanics' Magazine, vol. 7, p. 321; Register of Arts and Sciences, vol. 2 (*new series*), p. 328; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 133.]

A.D. 1825, November 26.—N° 5298.

KINGSTON, WILLIAM, and KING, HENRY.—"Improved fids for topmasts, gallantmasts bowsprits and all other masts and spars to which the use of the fid is applied."

Several sorts of fids are described. In one, the mast is held up by two wedge pieces bearing against the fid-plate and resting upon a bar passing through the fid-hole. Behind the wedge pieces are two small pieces which take against rebates in the fidding bar. Screws are fitted in the wedge pieces, and work against the ends of the fid-plate, to drive out the wedge pieces.

Or the mast may be supported by sliding bolts driven into the fid-hole by screws.

Also similar sliding bolts may be used and the bolt may be made with a heel which takes against a rebate in a fixed box. A screw keeps the heel against the rebate, but when the screw is loosened, the bolt slips over the rebate, and the mast is unfidded. Two modifications of this method are shown, in one of which the screw works against the end of the bolt, in the other upon its side.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 11, p. 293.]

A.D. 1826, January 19.—N° 5324.

SEPPINGS, Sir ROBERT.—Masts and bowsprits.

These are built up of ordinary baulk timber instead of the usual large timber. The beams are fastened together with trenails, bolts and coaks, the centre pieces being first united, and those on the outside being joined to each other and then to those in the centre. The joinings at the ends of the pieces

are made to overlap, and are united by scarphs or preferably by coaks. The whole mast is hooped together with "screw" or "drift" hoops; the head of the mast and the heel are of the same form so that "in case of accident the one may be substituted for the other." The intermediate portion of the mast is all of the same diameter.

Dimensions for various masts are given.

[Printed, 10*d*. Drawings. See Repertory of Arts, vol. 2 (*third series*), p. 331; also vol. 8 (*third series*), p. 158; London Journal (*Newton's*), vol. 13, p. 245; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 132.]

A.D. 1826, February 11.—N^o 5333.

HIGGINS, JOHN LANE.—"Masts, yards, sails, and rigging."

Two sails are shown in the drawing and described. One is a fore-and-aft sail "the tack, head and peak being an arch or equal distance from the sheet." "The head of the sail is set upon" a gaff. "The fore end travels between two ropes extending from the deck" to a short gaff at the mast-head.

There is also "a flexible spar standing on the boom, on which the luff of the sail travels with cringles or lacing. "The luff of the sail is hauled forward by a rope through a block or blocks on the mast." In the drawing, reef points are represented in lines passing from the sheet diagonally across the sail like the sticks of a fan. The sail is in shape the quarter of a circle.

The second sail described is "a lug sail set between a pair of sheers."

"The luff of the sail travels up and down a flexible spar" standing on the boom, and having a rope to the mast head, which being hauled tight together with the sprit sets the luff of the sail. A sail set in this manner as a mizen, with the boom attached to the stern of the vessel by a swivel, will help to tack and veer the vessel. The flexible spars may be made from one piece of wood being sawed in one or more cuts from one end nearly to the other, and then covered with canvass, or any other materials, or they may be made by several slips of wood round a rope, and then covered with canvass, or any other material."

[Printed, 8*d*. Drawing. See Repertory of Arts, vol. 3 (*third series*), p. 353; London Journal (*Newton's*), vol. 14, p. 14.]

A.D. 1826, May 6.—N° 5357.

SEPPINGS, Sir ROBERT.—“Construction of fids,”

The whole Specification runs as follows :—

“My invention is for striking the topmasts and top-gallant-masts of ships, by relieving them of their fids, and also by which the rigging of ships may be slackened or set up to a certain degree at pleasure.

“The nature of my invention is to place upon each trestle-tree a metallic plate, having a female screw for the reception of a male screw, with convex heads on which the fid is supported. The fid is formed and placed as usual, with the exception of having its under side concave from end to end; this enables it to rest securely upon the convex heads of the screws. The screws, which are turned by short levers, are to be of sufficient length to allow them to be always so far out of the trestletrees, that by suspending the masts of the top ropes, and passing the male screws into the sockets or female screws, the fid may be sufficiently relieved from the weight of the mast and stress of the rigging as to be easily removed. The screws will also allow of the rigging being set up or slackened.”

[Printed, *ad.* No Drawings. See Repertory of Arts, vol. 4 (*third series*), p. 178; London Journal (*Newton's*), vol. 14, p. 194; Register of Arts and Sciences, vol. 1 (*new series*), p. 325.]

A.D. 1826, October 18.—N° 5420.

VINEY, JAMES, and POCOCK, GEORGE.—Applying kites to propel vessels and to other purposes.

“This Patent is obtained for an invention by which kites are made to act as endyant sails, for the purpose of navigating or drawing vessels or drawing carriages, for the purpose of raising weights or persons in the air, for life preservers in cases of shipwreck, for signals, or for the hoisting of flags. The peculiarities of these kites are—First, they are rendered portable by folding up, there being points in the wings, and also in the standard. Second, there is a moveable distender, by which the wings are spread. Third, they have four lines by which their power is controlled or their course directed. Fourth, the invention also consists of attaching kite after kite at a convenient distance one behind the other, by which plan an indefinite power may be obtained.”

The Specification also describes a method of applying kites to land carriages.

[Printed, *6d.* Drawing. See Repertory of Arts, vol. 4 (*third series*), p. 969; London Journal (*Newton's*), vol. 1 (*second series*), p. 29; Register of Arts and Sciences, vol. 1 (*new series*), p. 1; Engineers' and Mechanics' Encyclopædia, vol. 1, p. 322, also vol. 2, p. 478.]

A.D. 1827, March 22.—N° 5474.

ROTCHE, BENJAMIN.—“Diagonal prop for transferring perpendicular to lateral pressure.”

The object of this invention is to relieve the lower mast and and trestle-trees from some of the perpendicular weight of the top-mast. To the heel of the top-mast is hinged a prop or lever which takes into a notch in the lower mast. When the top-mast is raised in order to remove the fid, the prop falls out of the notch.

If “the patent lever lid is used, the prop should come to its place before the levers are quite brought down to a level,” so that the bringing them down will disengage the prop.

[Printed, *6d.* Drawing. See Repertory of Arts, vol. 6 (*third series*), p. 337; London Journal (*Newton's*), vol. 1 (*second series*), p. 292; Register of Arts and Sciences, vol. 1 (*new series*), p. 380; Engineers' and Mechanics' Encyclopædia, vol. 1, p. 494.]

A.D. 1827, June 8.—N° 5503.

CLARKE, JOHN WERE.—“Securing the dead eyes to the channels and sides of ships.”

Instead of the usual method of chains and channels, the inventor uses a bent knee to support the channel. At the end of this knee is a hook, to which the dead-eye is attached. Outside the dead-eye is fixed a stop, to prevent it from falling off; the stop is so fastened as to give way if the mast falls overboard and drags on the rigging. The knees are secured with bolts, which may pass through the side of the ship and be secured by screws and nuts on the inside.

In case of the channels being struck by a sea, they may be made hollow between the knees, and have a framework of diagonal bars of iron fixed across them.

[Printed, *6d.* Drawing. See London Journal (*Newton's*), vol. 2 (*second series*), p. 339.]

A.D. 1827, December 22.—N° 5593.

FERGUSON, CHARLES AUGUSTUS, and ATLEE, JAMES FALCONER.—“Construction of made masts.”

The mast is built up of several pieces round a central core. This central piece is square, hexagonal, or of some other angular figure, and the surrounding pieces are cut to fit it and each other. The central core is in as few pieces as possible, and when it is necessary to use more than one piece, the joints are made with bolts let into opposite and corresponding holes or channels in the butts. From the side of the timber holes are bored down to the ends of the bolts, and nuts are fitted on them, so that they may be screwed up and draw the timbers together. A plate of copper, &c. is placed between the butts. The holes for the nut are filled up with wood fixed with pitch, &c. The outside pieces are so that the joints may be as far as possible apart, and the coaks by which they are fastened are in the same way alternate with one another, so as not to weaken the central piece. The inventors prefer to use the coaks patented by J. F. Atlee, No. 5073, A.D. 1825. When complete the mast is hooped, preferably with the hoops described in the Specification of Atlee's Patent, No. 5607. Bolts are also driven across the mast to secure it still further.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 8 (*third series*), p. 155; London Journal (*Newton's*), vol. 7 (*second series*), p. 26.]

A.D. 1828, January 15.—N^o 5607.

ATLEE, JAMES FALCONER.—Hoops for masts, &c.

The hoop is made in any convenient number of segments and the lengths are united by double screws with a central boss fitting into right and left-handed female screws in the ends of the segments. At the bottom of each female screw a small space is left to be filled with a lubricating substance or which is forced out by the screw as it works down. The screws and the segments should all correspond, so that if one is lost its place may be readily supplied.

The hoops are available for masts, yards, bowsprits, &c.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 8 (*third series*), p. 664; London Journal (*Newton's*), vol. 7 (*second series*), p. 28.]

A.D. 1828, May 1.—N^o 5645.

HILLMAN, THOMAS.—"Construction and fastening of made masts."

The different pieces of which the mast is composed are fastened together with battens fitting in dovetail grooves along

their whole length. Any number of timbers may be thus fastened together, if needful round a central piece. In scarphing the pieces together similar battens and grooves may be employed. In constructing the mast the timbers are temporarily hooped together and the battens driven in. Instead of using separate battens, a dovetail joint may be cut out of the solid in each piece, and the two thus fastened.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 8 (*third series*), p. 596; also vol. 9 (*third series*), pp. 13 and 31; London Journal (*Newton's*), vol. 4 (*second series*), p. 278.]

A.D. 1828, May 6.—N° 5650.

BROOKING, SAMUEL.—“Turning or slipping fid.”

The fid consists of an iron cylinder mounted on gudgeons and capable of being revolved by a handspike fitting in openings in the cylinder. One side of the cylinder is cut away so as to present a plane surface on which the top-mast rests by means of a notch in its side, when the fid is fixed in position on the tressel trees. At the other side of the heel of the top-mast is a wedge, or an iron pall, or other means for preventing it from slipping off the fid. If preferred the top-mast and lower mast may be lashed together. To unfid the mast, the catch opposite the fid is removed and the fid turned round so that the top-mast may slide off the fid, and be lowered in the usual manner. To support the fid under the weight of the mast, a bar or socket may be fitted below it.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 5 (*second series*), p. 284.]

A.D. 1828, September 4.—N° 5695.

BROOKING, SAMUEL.—Making sails.

The improvement consists in placing the seams and the pieces of sail cloth in such a direction in the sail that they may support the greatest tension. In square sails the seams run diagonally downwards from the centre line of the sail outwards on both sides. In triangular sails they run about at right angles to the stay or “hypothénusal” side of the sail.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 8 (*third series*), p. 536; London Journal (*Newton's*), vol. 7, (*second series*), p. 85; Register of Arts and Sciences, vol. 3 (*new series*), p. 301.]

A.D. 1829, February 5.—N° 5769.

GREEN, RICHARD.—“Construction of made masts.”

The principal part of the invention consists in a method of joining the butts or ends of timbers used for masts. A square tenon on one piece fits into the ends of the other piece, and there are also two iron braces, one on each side, which are bolted together through the mast. These braces are open in the middle, and are broader at their ends. They have also projections at their ends which are let into the wood. If the mast is made of more than one thickness of wood, the pieces are joined with coaks, and their ends are united as above described except that the braces are fixed by screws merely instead of by bolts passing through the mast. The masts are hooped in the usual way.

[Printed, *ed.* Drawing. See Repertory of Arts, vol. 8 (*third series*), p. 714; London Journal (*Newton's*), vol. 5 (*second series*), p. 337.]

A.D. 1829, April 11.—N° 5780.

PRIOR, WILLIAM.—Fids.

The mast is supported by bolts either working in grooves on a carriage fixed on the tressel trees or pivotted in a similar position. Of these bolts there are two, one on each side, each fitting into a recess in the heel of the top-mast. Each bolt is worked by a cam, the concentric part of which keeps the bolt in position, while when the excentric part comes against the bolt it allows it to slide back under the pressure of the mast. There may be a projection on the bolt fitting a groove on the surface of the cam to guide the bolt. The cam is worked round by a handspike.

[Printed, 1s. Drawings. See Repertory of Arts, vol. 10 (*third series*), p. 325; London Journal (*Newton's*), vol. 5 (*second series*), p. 261; Register of Arts and Sciences, vol. 4 (*new series*), p. 129; Rolls Chapel Reports, 7th Report, p. 130.]

A.D. 1830, February 27.—N° 5914.

DE LA GARDE, PHILIP CHILWELL.—“Improvements in
“ apparatus for fidding and unfidding masts and in masting
“ and rigging of vessels.”

The improvements in fids “consist in a compound fid, to be
“ inserted through the fid hole in the lower end of a top mast,”
“ and consisting of two separate wedges disposed one above the
“ other, with the thick end of one wedge over the thin end

“ of the other, so that the two when put together will form a parallel or prismatic fid equally thick at both ends. The two pieces ” “ are inserted into the fid hole separately one above the other. ” “ The two angles are made of such form and proportions that when they have both been driven fowards into the fid hole ” “ until their opposite ends coincide, ” “ the two will occupy the rectangular fid hole like a solid prismatic or parallel solid fid. ” “ The two wedges are retained in the fid hole by catches formed on the ends of levers (which are adapted to be acted upon by suitable tackle of ropes and pulley blocks), so that the said catches can be curved to unite the wedges together, and prevent either of them being drawn out separately from the fid hole, or else the said catches can be caused to release the wedges at pleasure. ”

The improvements also consist “ in the application of rollers between the two wedges to facilitate their sliding one upon the other when they are to be withdrawn from the fid hole, the said rollers being disposed within a hollow cut out in the lower one of the two wedges to receive the rollers, their circumferences being a little prominent above the inclined surface to which the inclined surface of the upper wedge applies when they are inserted into the fid hole, whereby the upper edge bears upon the rollers of the lower wedge ; and also in the application of rollers within the fid hole, ” “ to bear upon the top of the upper wedge, and other rollers upon the tressel-trees at each side of the heel of the top mast for the ends of the lower wedge to bear upon, so that every sliding surface of the said wedges may move upon rollers. ” “ Therefore when the catches which fasten the two wedges together are caused by their tackle to release them (the weight and strain of the mast being previously eased by swaying upon the top rope) each of the wedges separately can be drawn out of the fid hole by tackle attached to it. ”

The improvement in masting and rigging vessels consists in “ bringing one or more pairs of the foremast shroud from the chains up to the hounds, and fastening their ends to framework applied round the hounds under the tressel-trees, instead of applying those shrouds around the mast, above the tressel-trees in the usual manner. By thus altering the

"direction and manner of fastening some of the foremast shrouds, room is allowed for the yard to be braced up sharper" without pressing against the stays or rigging. "The improvements further consist in reeving the tack through a block which can be traversed to and fro' obliquely to keel, and fixed at different places, more or less in board, in an oblique direction to the keel," "whereby when the yard has been braced up very sharp," "the tack may be properly disposed to extend the foot of the course" in a direction parallel to the yard.

[Printed, 1s. 4d. Drawings. See London Journal (*Newton's*), vol. 5, *conjoined series*, p. 309; Register of Arts and Sciences, vol. 5 (*new series*), p. 133.]

A.D. 1830, March 20.—N° 5918.

RAMSAY, JAMES, RAMSAY, ANDREW, and ORR, MATTHEW.
—"Manufacture of canvass and sailcloth."

The improvements consist in the yarn of the weft being placed "at oblique angles" with the warp; these angles being varied to suit the shape of the sail, &c. This effect is produced by suitable modifications in the loom. "The breast beams and yarn beams are to be made moveable," "and are to be placed from time to time at the same angles with the side of the loom" as the weft makes with the warp, and there clamped. A minute description of the loom as modified is given.

In making the sails, "the sailmaker may arrange the cloth in the sail according to the usual or any other manner" but the angle between the warp and weft should be such "that the greatest pressure or strain on the sail should be in the direction of the thread or yarn of the weft or wool and warp."

[Printed, 4d. No Drawings. See London Journal (*Newton's*), vol. 8 (*second series*), p. 5; Register of Arts and Sciences, vol. 5 (*new series*), p. 162.]

A.D. 1830, April 24.—N° 5932.

COOK, THOMAS.—Boats.

Besides certain improvements in the boats themselves, the inventor describes two detaching hooks, one for letting go a boat's sheet, and the other for lowering a boat.

In the first a lever is jointed to the boat's side in the proper position, and has under its long arm a spring which keeps the

short arm down against the side of the boat. The short arm has jointed to it a pin on which a pulley is mounted, and the pin takes into a hole in the boat's side. When the spring is pressed down, the pin is raised out of its socket and the sheet runs loose from the pulley. There is a similar apparatus on each side of the steersman.

The second hook works on a hinge and has a link fitted over its point. To this link there is fastened a bar and a handle by which it can be raised from the hook. To secure the boat a gripe is passed under it, and the ends, on which thimbles are seized, hooked on. This hook may be fastened directly to the ship or to a block, so that the boat may be detached after being lowered.

[Printed, 1s. Drawings. See Repertory of Arts, vol. 2 (*new series*), p. 6; London Journal (*Newton's*), vol. 1, (*conjoined series*), p. 291; Register of Arts and Sciences, vol. 5 (*new series*), p. 65.]

A.D. 1830, September 7.—N° 5997.

PEARCE, HENRY GEORGE, GARDNER, RICHARD, and GARDNER, JOSEPH.—“Improved fid.”

The fid consists of an iron bar with a screw at each end which works in a socket in the tressle-trees. By turning these screws after the fid is in its place the mast can be set up and the rigging tightened. This fid may be used by itself or in conjunction with the common fid, in which case wedges may be used to hold the fid tight after the mast has been set up by the screw fid, which may then be removed. The common fid and the screw should be fitted to lie across one another. If preferred the screw fid may be made sufficiently small to fit entirely into the fid-hole, and then the screws work against a plate on the top of a bar used as a fid. Sufficient space must be cut out to allow the screws to work.

The fid is also applicable to sliding bowsprits.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 11 (*third series*), p. 332; Register of Arts and Sciences, vol. 6 (*new series*), p. 14.]

A.D. 1830, November 1.—N° 6022.

SHORES, JEFFERY.—“Tackle and other hooks.”

The hooks are intended principally for lowering boats, but are also available for other purposes. Each hook hangs on a pivot, and has a heavy shank beyond the pivot, so that when *the weight is taken off the hook* (as by the boat reaching the

water), the shank overbalances it, and the hook swings free. For heisting the boat, &c., there is a small line attached to the end of the hook; this is rove through the ring-bolt, and made fast with a hitch to a pin on the strap supporting the hook, which is thus prevented from turning. If the hook is required to be used without turning, the shank may be made fast to the strap by a short line passing through suitable holes.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 11 (*third series*), p. 101; Mechanics' Magazine, vol. 15, p. 14; London Journal (*Newton's*), vol. 5 (*conjoined series*), p. 375; Register of Arts and Sciences, vol. 5 (*new series*), p. 257.]

A.D. 1832, November 8.—N° 6330.

TAYLOR, WILLIAM WILKINSON.—“Cloth for sails.”

The fabric is made of hair, that known as “ox and cow” hair” being most suitable. This is carded and combed, and then made into slivers which are spun into thread. For both weft and warp a thread made of two single threads twisted is preferred. The cloth is then “submitted to the process of” fulling or felting, similarly to woollen fabrics.” A closer cloth, better suited for holding the wind, is thus produced. In making sails, the pieces should be sewn with “a strong” thread made of the same material which the sail cloth is “composed.”

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 15 (*third series*), p. 328; London Journal (*Newton's*), vol. 3 (*conjoined series*), p. 201.]

A.D. 1832, November 13.—N° 6332.

HEATHORN, JOSEPH LIDWELL.—Ships' rigging.

The improvements consist in attaching springs to the shrouds or other part of the rigging where it is required to ease any strain. The springs shown are all helical metallic springs of the usual character, except one which is formed of two bars of wood, clamped together in the middle, and having a shroud attached to each end of one bar, while the ends of the other bar are attached to the chains. To avoid risk of breakage, a slack length is attached to the shroud above and below the spring.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 3 (*conjoined series*), p. 206; Rolls Chapel Reports, 7th Report, p. 141.]

A.D. 1822, August 12.—N° 467.

BLAKE, PETER. *FLYING SHEET*.—Fig.

The *fly-plate* is pivoted to the heel of the *top-mast*, so that it may either rest across on bearing plates in the *normal* position, or may drop down into the *fly-hole* and allow the mast to descend. At one end the *fly-plate* rests upon a fixed bearing plate, and at the other upon a moveable bearing plate. The *fly-plate* is not pivoted in the middle, or has one end weighted, so that when the moveable bearing plate is removed the *fly-plate* falls of itself. The *fly-plate* is of peculiar shape, having a curve over the place, at which the *top-mast* rests, while the ends are cut away. In order that the mast may be unfitted without slackening off the rigging, the carriage below the moveable bearing plate is grooved out to allow the end of the *fly-plate* to fall freely. In order to move the bearing plate, it may be formed like a bar with a support for the *fly-plate*, pivotted at top, and having a line attached below by which it may be started. Or where greater force is required, the lower end may rest on the short arm of a lever, the long arm of which is worked by a line. In either case a catch or pin may be used to keep it in its place.

[Printed, &c. Drawing. See *Repertory of Arts*, vol. 1 (new series), p. 65; *London Journal* (*Newton's*), vol. 5 (conjoined series), p. 311; *Mechanics' Magazine*, vol. 20, p. 300.]

A.D. 1834, July 10.—N° 6643.

BEADON, GEORGE.—Apparatus for easing off ropes.

The object is to provide a means whereby the sheet, &c. may be automatically eased off when the vessel heels over too far. The sheet is coiled round a barrel, upon one end of which is a pallet wheel and catch. Attached to the catch is a weighted lever, so arranged that in the normal position it keeps the catch in the teeth of the wheel, but when the ship heels too far over it swings back, and releases the catch, allowing the sheet to run free. To assist the movement there is a spring pressing upon the spindle of the barrel, and upon a pin on the catch; the hole in the barrel for the spindle is oval, so that the strain of the sheet may, when the vessel rolls, force the spindle against the spring, and take off the pressure from the pin on the catch. Two modifications of the way in which the lever is arranged are figured. There is also a similar

arrangement in which the lever rests on a float in a vessel of fluid. When the float is inclined too much to the plane of the deck, the catch is released as before. It is stated that by means of this float the best trim for loading the vessel may be obtained, as it will show whether she is down by the head or stern, and the cargo can be shifted accordingly.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 8 (*conjoined series*), p. 228; Rolls Chapel Reports, 7th Report, p. 153.]

A.D. 1835, January 12.—N° 6743.

SMITH, ANDREW.—Standing rigging.

The shrouds are made of a number of metal rods or wires. These are passed through a hole in a plate bolted to the cross-trees, and their ends heated and upset so as to form a solid head which cannot be drawn through the hole. Below they are connected in the same way to a tube, formed conical at the end so as to hold the head formed on the wires. On the outside of this tube is cut a screw on which is a nut. By passing the tube through a hole in the chain plate and screwing up the nut the rigging is tightened. The wire shrouds may be covered with "cloth saturated with india-rubber or other preserving mixture," and over this may be coiled a "coating with cord."

In order to enable the masts to be cut away, the shroud may be fixed in a collar which fits under fids or keys sliding in notches in a cup; on removing these keys, the shroud is let go.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 359; and vol. 21 (*conjoined series*), p. 138; *Mechanics' Magazine*, vol. 37, p. 189.]

A.D. 1835, February 6.—N° 6758.

ROBERTS, THOMAS.—"Joining pieces of timber together end to end."

The invention is applicable to "masts, topmasts, bowsprits, yards" &c., and is to be used instead of scarf joints. It consists,—

"In forming the overlapping parts, at each of the two ends which are to be joined together, in such manner that each such overlapping end will be forked, the two prongs or legs of each fork being disposed diametrically opposite to each

“ other across the centre of the general mass of the pieces of
“ timber which are to be joined, and the two pieces are put
“ together with the said prongs or legs of the forks of each
“ piece mutually interlocked or interspaced and included one
“ between the other, so that each prong or leg of each fork
“ belonging to one piece of timber will have a prong or leg
“ of the fork belonging to the other piece in close contact
“ with it on both of its sides. And for this purpose the
“ surfaces of the respective prongs which are so brought into
“ contact must be planes which cross and intersect each other
“ in the centre line of axis of the mass of each piece of timber,
“ and the ends of the two prongs of the forks of each piece
“ must abut solidly against the shoulders between the forks
“ of the other piece, so as to fill up all interstices between the
“ forks of the several pieces, and make out the junction of
“ the two pieces to the same size as the other parts of the
“ timber; and the said junction may be secured by metal
“ bolts or pins inserted transversely across the prongs of the
“ forks, transfixing both the opposite prongs of each fork,
“ so as to unite and bind them together, and that binding
“ together may be rendered more complete by surrounding
“ the junction with suitable metal hoops in order to keep the
“ fitting surfaces of the prongs in close contact with each
“ other, and longitudinal straps of metal may be applied
“ along the sides of the joined pieces, and overlapping the
“ junction, and united by bolting through.”

[Printed, 10d. Drawing. See Repertory of Arts, vol. 4 (*new series*),
p. 202.]

A.D. 1835, July 13.—No 6862.

MABERLY, FREDERICK HERBERT.—“ Propelling vessels.”

Vessels are propelled by paddles worked by windmills. The sails may be mounted vertically as in the common windmill, or “ as the sails of a fantail,” or horizontally. In the first case the spindle on which the sails are fixed is mounted on a hollow vertical pillar supported so as to revolve freely in two collars, one on the deck, and the other near the top of the pillar, the latter being held by stays. To bring the sails into the wind, a “ fantail ” is used which is fixed to the vertical post. This turns a cog-wheel engaging in teeth on the upper collar, and *thereby revolves the pillar*. Power is transmitted to the pad-

dle-wheel shaft by a shaft passing down the centre of the pillar actuated by a bevel wheel on the "wind shaft," or there may be a crank on the "wind shaft," and a connecting rod may work a similar crank on the paddle-wheel shaft.

If "fantail" sails are used, they may be mounted on a projecting horizontal spindle which may have a set of sails at each end, or they may be mounted between projecting arms, which must have supports either reaching to the deck and travelling on rollers thereupon, or attached to the central revolving pillar. The sails are kept in the wind by "the" "extreme ends of the arms being lashed to the sides of the" "vessel." Motion is transmitted to the paddle in a similar way to that before described.

When horizontal sails are used, they are mounted direct on the central spindle without any intervening gearing.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 25, p. 62.]

A.D. 1835, August 26.—N° 6892.

HIGGINS, JOHN LANE. — Construction and propulsion of vessels.

The only part of this invention which refers to the present series, consists of a special windlass "for raising the masts of" "barges or other vessels which have to pass under bridges." It is stated that in this windlass the power is greatest at first, and that the speed increases as the mast is raised.

It consists of three "double wheels or pullies" each with a large and a small barrel on the same axle. A chain leads from the masthead round the small barrel of the first wheel; a second chain passes round the large band of the first wheel to the small barrel of the second wheel; a third from the large barrel of the second wheel to the small barrel of the third wheel. The third wheel is worked by a winch or otherwise.

* [Printed, 8d. Drawing. See *Repertory of Arts*, vol. 6 (*new series*), p. 165; *London Journal (Newton's)*, vol. 9 (*conjoined series*), p. 231.]

A.D. 1836, December 3.—N° 7238.

CARVALHO, DAVID NUNES. — Propelling vessels and carriages.

A windmill is erected on a ship's deck, and motion transmitted therefrom to drive paddle wheels. On an upright central shaft a number of vanes are arranged radially. Each

of these vanes is composed of a framework of prismatically shaped wooden bars. To these bars are hinged plates which hang downwards in such a way that they yield to the wind in one direction, but not in the other. The result of this is that the vanes on one side are carried round by the wind, while those on the other do not offer much resistance to the wind, and consequently the whole wheel is revolved.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 8 (*new series*), p. 142.]

A.D. 1836, December 21.—N° 7261.

SMITH, ANDREW.—Standing rigging and chains.

The first part of the invention relates to improvements on No. 6743. In that Specification a method of forming wire ropes covered with various coatings was described. The present Specification describes a method of splicing such rope round a thimble. The wires are twisted round a long pear-shaped thimble, they are then separated, and the ends passed through the other part of the rope in the same way as with a hempen rope.

The second part refers to a method of making links for chains of wire. The wire is coiled round "a mould shaped like a pulley, but of an elliptical form." The link thus formed is immersed in a suitable molten metal, and thus soldered into a solid form. Instead of wire, long strips of metal may be used "cut into the form of a section taken lengthwise of a very long parabolic spindle." To unite the links together, two already formed links are placed in suitable recesses in the mould, and the wire passed through them, so that the link when formed passes through the other two links. "Links of any required length suited for shrouds and stays" may be thus formed and made into a chain, "and when the chain has been so formed the sides of the links may be twisted by any mechanical means, and adapted to the purpose of shrouds or stays."

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 92; also vol. 21 (*conjoined series*), p. 138; *Mechanics' Magazine*, vol. 37, p. 189; *Rolls Chapel Reports*, 7th Report, p. 182.]

A.D. 1837, September 7.—N° 7430.

HUNTLEY, HENRY VERE.—"Apparatus for facilitating the securing of ships' masts."

The apparatus is proposed to be used in place of the dead-eye for setting up shrouds. The lower end of the shroud is secured round a thimble, in which a pulley with two or more sheaves is fitted. In place of the lower dead-eye a similar pulley is used with a block perforated like a windlass, so that a handspike can be inserted to turn it round. There is also a rack and pawl to prevent its returning. This pulley is fixed to the chains. One end of a lanyard is made fast to the chain; it is rove through the blocks of both pulleys; a turn is taken round the block with the windlass on it, and by its aid the lanyard is tightened.

[Printed, 8d. Drawing.]

A.D. 1838, September 20.—N° 7814.

DAY, WILLIAM.—“An improved mode or method of applying
“and combining timber and other materials used in the construction of ships or vessels, masts, yards, beams, piers,
“bridges, and various other purposes.”

[No Specification enrolled.]

A.D. 1839, July 13.—N° 8150.

WOODLEY, WILLIAM.—“Propelling vessels and carriages.”

A windmill for driving paddle-wheels to propel a ship is described. The wheel is mounted on a horizontal spindle. The vanes consist each of a pair of folding plates of canvas, &c. hinged to an arm, the arms being arranged radially to form the wheel. Stops are arranged so that the plates may be blown open by the wind from one side, but yield to it on the other, so that as the vanes on one side offer resistance to the wind while those on the other side yield to it, the wheel is continually revolved. The framework on which the wheel is mounted can be moved so as always to bring the axis of the wheel to a position corresponding with the direction of the wind.

[Printed, 1s. 4d. Drawing. See London Journal (*Newton's*), vol. 15 (*continued series*), p. 372; *Mechanics' Magazine*, vol. 33, p. 379; also vol. 39, p. 338; *Inventor's Advocate*, vol. 2, p. 132.]

A.D. 1839, August 16.—N° 8197.

ADAMS, WILLIAM BRIDGES, and BUCHANAN, JOHN.—Wheel carriages, propelling and securing ships, &c.

The only part of this Specification connected with the present series consists in a proposed application of springs to the standing rigging of ships. The spring figured as suitable for this purpose is a simple curved spring, and is termed a "longitudinal extension spring." One end is attached to the hull, and the other to the rigging, the springs being of such proportion and strength that when the rigging is strained into sufficient tension the springs will retain sufficient curvature to yield as much by elongation as will serve to moderate the sudden strain ensuing from violent winds and waves or other causes."

A description is given of a larger spring, suitable for cables, but this is not stated to be adaptable for rigging.

[Printed, 1s. 8d. Drawings. See *Mechanics' Magazine*, vol. 32, p. 465; *Inventor's Advocate*, vol. 2, p. 163.]

A.D. 1840, December 31.—N° 8762.

NEWTON, WILLIAM.—(*A communication.*)—"Rigging of ships."

The improvements relate to a means of tightening the shrouds, &c.

A bar slides within a box formed to receive it. On the bar is formed a rack. Attached to the side of the box are cheeks with a pivot, carried by which a lever works. The slot through which the pivot passes is curved or "of a kidney shape," so that the lever has considerable play. The end of the lever is notched to correspond with the rack, so that by actuating the lever the rack may be driven forward. A pall prevents its moving in more than one direction. The rack bar is to be attached to the shroud, and the box to the ship's side, to tighten the rigging. By removing the pin in the slot of the lever, the latter may be removed, and a lid is provided which shuts down over the pall and rack.

Some modifications are given. Instead of a bar, a windlass with a cog wheel may be used, and the shroud, &c., wound thereon. Or, instead of a bar, a "ladder chain" may be used, into the links of which the notches on the lever take. Also the box may be dispensed with, and two plates carrying the pivot for the lever attached directly to the link into which the shroud hooks.

[Printed, 10d. Drawing. See *London Journal (Newton's)*, vol. 20 (*continued series*), p. 8; *Mechanics' Magazine*, vol. 35, p. 61; *Inventor's Advocate*, vol. 5, p. 22.]

A.D. 1841, September 17.—N° 9085.

STOLLMAYER, CONRAD FREDERICK.—(*A communication.*)
—Propelling vessels.

Various methods of propelling vessels are described. The only one connected with the present series is as follows :—

One large fan-like sail is used in the bows. This sail is supported on radiating ribs like the sticks of a fan, and these are hinged together in a semicircular framework on the deck. The sail is made in two halves, which are hoisted up to a short mast. It is supported by stays from the ends of the ribs. Along its lower edge is a yard. It may be entirely or partly hoisted, some of the ribs being made fast either to the yard or to the mast. For raising it, ropes fixed to the first rib of each half are carried over pulleys on the mast ; for lowering, ropes are led through rings on the ribs over pulleys on the ends of the yard. Ropes for working the sail also pass from the ends of the yard. All these lines are led aft and wound upon drums, any one of which may be thrown into gear with a shaft driven by a windmill at the stern. The whole working of the sails is thus effected by the windmill.

To keep the sails of the mill in the wind, there is a triangular sail or “tail” on a continuation of the shaft of the sails.

[Printed, 2s. Drawings. See *Inventor's Advocate*, vol. 5, p. 330.]

A.D. 1841, October 7.—N° 9112.

BARRÉ, MATHIAS NICHOLAS LA ROCHE.—“Fabric applicable
“ to sails.”

The invention consists “in forming each warp thread of two
“ or more yarns of cotton twisted together, and each shoot of
“ the weft of four or more yarns of cotton.”

[Printed, 4d. No Drawings. See *Repertory of Arts*, vol. 1 (*enlarged series*), p. 277 ; *Mechanics' Magazine*, vol. 36, p. 313.]

A.D. 1841, December 9.—N° 9171.

POOLE, MOSES.—(*A communication.*)—Masts and shrouds.

The mast is built up of five long pieces of wood. Four of them are shaped so as to form the outside shell of the mast, and the fifth is driven in, after the others have been so placed with hoops about them, in the centre, to tighten up the whole.

A spring is attached to each shroud; it is formed of a tube containing a helical spring with a piston within it, one end of which is attached to the spring, and the other to the rigging. The outside of the tube may be graduated. It may be enclosed in a leather case containing a lubricant. A fastening for the shrouds is described as follows:—"This instrument is in the form of a triangle, open at its upper end, into which is placed a rod which serves to fix it to the rigging. The two sides are enlarged to a determined length in order to leave a passage for the cross-bolt of the rod, which ought to descend in order to release it as far as the space of the open part, when it would go out by its own weight."

[Printed, 1s. Drawings. See Repertory of Arts, vol. 1 (*enlarged series*), p. 150.]

A.D. 1842, April 15.—N° 9323.

JEFFERY, ALFRED.—"Preparing masts, spars, and other wood for shipbuilding."

The patentee employs glue to fasten together pieces of wood to form masts, &c. One pound of caoutchouc is mixed with four gallons of coal naphtha. The caoutchouc is cut into thin shreds before mixing. The mixture is set by and occasionally stirred till it is of the thickness of thick cream. It is then mixed with double its own weight of "gum lac or shell lac," and heated till the latter is dissolved. It is then drawn off, poured on slabs to cool and cut in pieces for use. The glue may also be made in a similar manner but without caoutchouc. The proportions of all the ingredients may be varied.

To use the glue it is heated to 250° Fahr., and spread on the surfaces to be united, which are forced together by any convenient means. If the glue is stiff, it may be warmed to 140° Fahr. by hot iron, &c. The pieces after being glued may be bolted or otherwise fastened together. Crevices in the wood may be filled up by pouring in the glue. "Any glues having the property of being insoluble in water, and more elastic than glue in ordinary use, might be applied in a similar way."

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 1 (*enlarged series*), p. 44; London Journal (*Newton's*), vol. 21 (*conjoined series*), p. 371; Mechanics' Magazine, vol. 37, p. 604; Record of Patent Inventions, vol. 1, p. 201; Transactions of the Society of Arts, vol. 64, p. 187.]

A.D. 1843, April 27.—N° 9715.

WINSPEAR, JOHN.—Reefing sails.

Bearings are attached to the ends of the yard. In these bearings an iron rod is fitted, which is covered with wood as far as the sail extends. On the ends of the rods rollers are fixed, and upon these rollers are wound chains which are led through sheaves in the yard arms to blocks at the centre of the yard and thence to the deck. By hauling on these chains, the sail is wound on the rollers and reefed. A guide rod is fixed along the yard to support the roller and direct the sail.

To furl the sail it is rolled up as far as it will go, and the rest furled on the old plan.

The method is applicable to all kinds of sails which are fastened to yards, booms, &c.

[Printed, 10d. Drawing.]

A.D. 1843, July 1.—N° 9811.

GREER, JAMES JOHN.—Securing standing rigging, &c.

In place of a lanyard a double right and left-handed screw is used, which works into two boxes of which one is attached to the shroud, &c., and the other to the ship's side. The shackles for this purpose may be fixed at the outer ends of the boxes or at the inner ends near the centre nut of the screw. The whole may be inclosed in leather, &c., to protect it from damp, &c.

With this apparatus a hook may be used which is hinged at its lower part and secured when in use by a mousing. The hinged part may also have a shank which, when the hook is in use lies parallel with the shank of the hook.

This hook may be used for other purposes, such as securing the mainsheet, &c.

By cutting the mousing it may at once be let go.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 3 (*enlarged series*), p. 79; Engineers' and Architects' Journal, vol. 7, p. 35.]

A.D. 1844, February 24.—N° 10,079.

TRAIL, ARCHIBALD.—Manufacture of sails.

Diagonally across the sail ropes are fixed, the ends of which are firmly secured into the bolt ropes. These ropes are secured by bands of canvas sewn over them on the sail. The

ropes are applied on both sides of the sail, those on one side being in a direction at right angles to those on the other, so that the sail is divided over its surface into small squares.

Any kind of sail may be thus treated, and the ropes may be arranged in any manner preferred over the surface of the sail.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 6 (*enlarged series*), p. 227; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 246; Patent Journal, vol. 8, p. 134.]

A.D. 1844, May 22.—N° 10,194.

CHATTEN, JAMES PERKINS.—Dead-eyes.

Three sorts of dead-eyes are described. In the first, the upper dead-eye, to which the shrouds are attached in the usual manner round a groove in the rim, has six slots each furnished with a pulley. The lower dead-eye, which is fixed to the ship's side, has four similar pulleys and two holes, one on each side, in each of which the end of a lanyard may be fastened. Below the row of pulleys is a rectangular opening in which is fitted a capstan with a ratchet wheel and pall at each end. Each lanyard after being fixed in the lower dead-eye is coiled round the pulleys of the two dead-eyes, three of the upper and two of the lower, and then given a few turns round the capstan in such a direction that by rotating the capstan and hauling on the lanyards, both lanyards may be tightened at once.

In the second modification, the capstan is in the upper dead-eye; there is only one lanyard used, and there are three pulleys in the upper dead-eye, and two with one hole in the lower.

In the third, the capstan is in the lower dead-eye and there are two lanyards; there are four pulleys in the upper dead-eye and two with two holes, in the lower. Both the dead-eyes are "oval or pear-shaped" instead of round.

[Printed, 10d. Drawing. See Mechanics' Magazine, vol. 41, p. 449; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 92.]

A.D. 1844, October 31.—N° 10,372.

BEADON, GEORGE.—Life boats, raising boats' masts, &c.

A method of raising and lowering boats' masts is described. A toothed sector is fitted to the mast, the teeth of which take into an endless screw on the thwart or in some other convenient

position. The screw is fitted with a handle so that it can be turned, and the mast thereby raised or lowered.

A boat's mast may also have gudgeons fitted to it which swing in bearings on the thwart, &c. so that it can be swung up or down.

The rest of the Specification does not refer to this series.

[Printed, 10d. Drawing.]

A.D. 1844, December 12.—N° 10,434.

POOLE, MOSES.—(*A communication.*)—Fids and apparatus for setting up rigging.

Two sorts of fids are described. In the first two plates are fitted to slide in opposite directions in a metal box in the top-mast. The inner portions of the plates are cut away so as to allow one to come above the other, and they have teeth cut on the sides next one another, into which a pinion on a spindle transversely across the mast engages. On turning this pinion by a handle outside, the plates are driven outwards so as to project from the box in the mast, and the mast is fidded.

In the second, the fid is fixed across the top-mast, and two arms are hinged to the top of the lower-mast in such a way that they can be brought under the projecting parts of the fid, or opened to allow it to pass. This may be effected by a right and left-handed screw, or by a pinion engaging in racks on opposite sides of it attached to the two arms.

For tightening the rigging, a screwed rod has affixed to it a shackle. The sides of this rod are hollowed out so that two plain rods may fit therein. At the end of these plain rods another shackle is fixed. Between shoulders on the plain rods a nut works freely. This nut is screwed to correspond with the thread of the screwed rod, so that when the three rods are in position, and the shackles hooked, one to the shroud, and the other to the chains, the rigging may be tightened by turning the nut.

[Printed, 1s. 2d. Drawings.]

A.D. 1845, January 23.—N° 10,493.

BORRIE, PETER.—“Construction and fitting or equipping of “ships.”

The greater part of the Specification deals with improvements in the hull, &c.

Masts and bowsprits are made of hollow metal tubes, within which the top-mast or jib-boom may slide. At the end of the top-mast or jib-boom is a pulley, over which a chain fixed to the top of the mast, &c. passes, so that by hauling upon it the top-mast, &c. can be raised. The free end of the chain is led over a pulley at the top of the mast, &c., and to a winch on deck. There is "an iron jointed strut connecting the middle of the yard to the mast," which can be disconnected when the yard is to be lowered. On the mast is an iron frame to which the shrouds and cross-trees are fixed.

[Printed, 1s. 10d. Drawings. See *Artizan*, vol. 7, p. 73.]

A.D. 1845, June 30.—N° 10,745.

GOODWIN, CHARLES.—"Masts and spars."

A beam of wood is divided lengthwise in two. The dividing line runs from a point in one side near the angle of the beam diagonally across to a similar point in the opposite side. The section of the two pieces thus formed is an irregular quadrilateral, and may be described as a nearly isosceles triangle with its apex cut off by a straight line. The two pieces are then fastened together with metal dowels, two of the equal sides being together. Their ends are made to overlap considerably. Five such pieces are then fixed around a central core of ten sides, with bolts. The external angles are planed down to a proper form, and the mast hooped. Throughout the separate pieces are arranged so that they break joint as far as possible. Variations may be made in the shape and number of the pieces employed, and one such is figured in which six, instead of five, are used. Without the help of a figure it is not easy to give an intelligible description of the shape into which the wood is to be cut.

[Printed, 8d. Drawing. See *London Journal (Newton's)*, vol. 28 (conjoined series), p. 165.]

A.D. 1845, July 21.—N° 10,777.

GILBERT, THOMAS WILLIAM.—Sails.

Square sails are made with the cloths arranged diagonally from the centre line of the sail. The cloths are arranged to overlap more in the centre than at the leaches, so that the cloths are thereby narrowed towards the centre. The centre seam is "in a succession of inclined steps."

In "quadrilateral fore and aft sails," the cloths are narrower at the fore leach than at the after leach, being arranged to overlap as above. The seams are "in a series of inclined "steps" as above.

In triangular sails the broad ends of the cloths may be in any part of the sail preferred, and they are made in the same way as those previously described.

[Printed, 10d. Drawing. See Repertory of Arts (*enlarged series*), p. 133.]

A.D. 1845, October 27.—N° 10,898.

ORTON, REGINALD.—Life-boats and life-saving apparatus.

A buoy is described provided with a mast and sail. The mast is hinged at the foot and is erected by a spring to the fore-stay or at the foot of the mast or otherwise. The principal use of the mast is to carry a port-fire, but it may also have a sail on it.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 8 (*enlarged series*), p. 214; *Mechanics' Magazine*, vol. 44, p. 269.]

A.D. 1845, November 15.—N° 10,942.

AYRE, JOHN.—Sail cloth.

The inventor says:—"In warping the threads of which what is called a bolt of canvas or any other fabric intended for sail cloths is to be made, I introduce one or more sets of threads of a stronger and stouter quality than the general threads used for the warp, each set of strong threads occupying about two inches of the width of the warp, and being at equal distances from each other; I then weave the fabric in the ordinary manner, except that, where I wish to strengthen the fabric by the weft at the parts where reef points are attached, or for any other purpose, I use a weft also of stronger thread than the generality of the weft."

[Printed, 6d. Drawing. See Repertory of Arts, vol. 7 (*enlarged series*), p. 345; *London Journal (Newton's)* vol. 28 (*conjoined series*), p. 314; *Patent Journal*, vol. 1, p. 19.]

A.D. 1846, January 6.—N° 11,029.

BROWN, WILLIAM SMITH, the younger.—"Square and "quadrilateral sails."

The invention consists of a method of arranging the seams of sails not easy to make clear without reference to a drawing. A seam runs from each clew to the opposite earing and another

vertically downwards from the point where these seams meet. In the upper triangle thus formed, the seams run vertically, in each of the lower quadrilaterals they radiate from the clews.

Sails made with the usual vertical seams may have bands or narrow strips of canvas sewn on them in the same directions as the seams in the sail above described.

There is a "tabling at the leach and foot instead of linings."

A schooner mainsail is figured in which a seam runs from the tack to the peak, above this the seams are parallel, below it they radiate from the corner.

A gaff-topsail of similar make is also figured.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 9 (*enlarged series*), p. 233; Patent Journal, vol. 1, p. 166.]

A.D. 1846, January 20.—N^o 11,053.

SPENCELY, JOHN.—Ship-building.

The last part of the invention consists of an improved mode of heaving in and out the bowsprit of a vessel, by the application of an iron rack to the upper or under side of the inner end of the bowsprit, and the employment of a strong pinion, which is made to gear into the rack. A pair of antifriction rollers work one on each side of the pinion on the bowsprit, to preserve the tackle from being strained.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 30 (*conjoined series*), p. 145.]

A.D. 1846, October 22.—N^o 11,422.

MACCARTHY, JOHN JAMES ALEXANDER.—“Anchors and fids.”

Two fids are described. In the first the top-mast has a rack fitted upon it, and the lower-mast a corresponding pall. A cord attached to the pall and passing through a pulley in the mast keeps the pall disengaged from the rack while the mast is being raised.

In the second fid a metal “strap” or loop is pivotted to the cross-trees on the lower-mast. On this the heel of the top-mast rests. The top-mast has on it a notch into which this “strap” fits. To disengage the “strap” a cord is fitted to it, by which it may be drawn aside to allow the mast to be lowered. This line passes through a pulley on the mast and down to the deck.

[Printed, 1s. 4d. Drawings. See London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 33; Patent Journal, vol. 2, p. 815; *Engineers' and Architects' Journal*, vol. 10, p. 179.]

A.D. 1848, August 7.—N° 12,230.

NEWTON, DAVID.—Applications of glass.

The inventor affixes "glass terminals of a globular or other form" to the mast-heads and yard-arms of vessels, to act "as a non-conductor or lightning repellant, and also as a telescopic object of view on the horizon." "These terminals are hollow, having an aperture" "communicating with the interior for the purpose of preserving the atmospheric equilibrium."

The rest of the Specification does not concern this series.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 34 (*continued series*), p. 246; *Mechanics' Magazine*, vol. 50, p. 140; *Practical Mechanics' Journal*, vol. 1, p. 279; *Artizan*, vol. 7, p. 184; *Patent Journal*, vol. 6, p. 205.]

A.D. 1848, September 15.—N° 12,269.

SAGER, WILLIAM.—Constructing ships and carriages.

The only part of this invention which refers to the present series consists in the use of balloons to support a ship's sail, thereby dispensing with masts. A square sail is attached to yards "in the usual manner" and to the upper yard are attached "one or more aerial balloons." The sail is connected to the ship by ropes only and is represented in the drawing as attached to the bows and towing the vessel along. The balloons are to be kept always inflated and when not in use are to be stowed between decks.

[Printed, 3s. 2d. Drawings. See *Mechanics' Magazine*, vol. 50, p. 261; *Artizan*, vol. 7, p. 207; *Patent Journal*, vol. 6, p. 234.]

A.D. 1848, September 28.—N° 12,274.

NEWALL, ROBERT STIRLING.—"Fastening and setting up the rigging of ships."

A spring is formed of a square iron tube filled with square pieces of india rubber alternating with iron plates. It is not stated very distinctly how the spring is to act, but presumably there is a central rod fixed to a base plate working in the tube. The spring may be applied between the shrouds and the channels, or may be attached to the ship's side and have the shroud made fast to it with a lanyard.

Also a screw for setting up rigging is described. A male screw on the end of a rod works in a long female screw, and on

the outside of this female screw is a second male screw which works in a second female screw. The ends of the rods have suitable swivels, &c. for attachment to the rigging.

The Specification also refers to locks, &c.

[Printed, 14d. Drawing. See *Mechanics' Magazine*, vol. 53, pp. 305 and 324; *Artisan*, vol. 7, p. 396; *Patent Journal*, vol. 6, p. 354.]

A.D. 1849, February 6.—N° 12,452.

BROWNE, JOHN. — "Improvements in constructing and rigging vessels, and improvements in atmospheric and other railways."

The inventor describes a "wheel-rigged ship" the characteristic of which is, that by means of a wheel or wheels, in connection with a long bar of iron, or "the wire ropes to which the sails are attached" the whole of the sails may be made to work round at once. The sails are "in a frame." "There may be one line of six masts, more or less; there may be likewise one or more lines of masts above to answer as top sails or top-gallant sails; they may be constructed and worked in the same manner by the wheel. There may be one or more keels or one broad one doing the duty of two. In having two rows of masts the projector relies upon the "pressure" of the windward sails, to counteract the pressure on the leeward sails. "The pressure on the windward side of the keel would act as a counterbalance to the pressure of the leeward side of the keel, and tend to steady the ship." The inventor would "propose for the wheel-rigged ship to be built in shape either as the hulls of ships are at present, or to have the hulls of the wheel-rigged ship, as well as other ships, a broad head with a sharp snout, and from the head to the stern to diminish gradually."

The inventor also describes improvements in "the atmospheric railway;" and in what he calls a "balloon railway."

[Printed, 4d. No Drawings. See *London Journal (Newton's)*, vol. 35 (*continued series*), p. 111; *Mechanics' Magazine*, vol. 51, p. 142; *Patent Journal*, vol. 7, p. 193.]

A.D. 1849, October 12.—N° 12,803.

CHRISTOPHERS, JOHN. — "Naval architecture."

The inventor describes in all twenty-five improvements, of which the following relate to the present series.

The eighth consists in adapting two new sails, one, called "a courson," is a "substitute for the square sail or course" and the other, called "a triangle," "is a substitute for the trapezium sails now used." The "courson" is almost or quite triangular, and has its apex or its shortest side downwards. It is bent to a yard above, and below has "only one tack and no sheet." The "triangle" is bent on a gaff and boom on the same mast as the "courson," or it may have no boom and be worked "upon a horse or with sheets like a jib." The top-mast slides on the aft-side of the lower-mast. "Some of the foremost of the shrouds" are "placed further aft than usual," and the chain-plates are "placed nearer to each other than usual." "Guys or stays from near the head of the triangle gaff lead to the sides of the vessel near the top-mast backstays." "Some of the after of each gang of shrouds may lead to the cap part of the masthead."

The tenth consists in making a yard of two small spars united by "a hollow wrought-iron cylinder, and a wood dowell fixed to the large ends of the two spars." Instead of the dowell a metal bolt or other connecting means may be used. The ends of the bolts may be run in with lead.

In the tenth, an improvement in dead-eyes is described. The upper eye consists of a horse-shoe shaped thimble round which the shroud is bent. In this is set a grooved roller or a set of blocks on a pivot. The lower eye consists of an iron frame in which a similar roller or set of blocks is fixed. This is fixed to the chain-plate.

The twentieth consists of making lower masts "in two or more lengths of wood, inserting the small end of one length into a deep square socket of another length," and fixing an iron cylinder over the joint by bolts.

The twenty-first consists in forming the lower mast out of "four spars pyramidically placed in the vessel." These spars rest on "cross-ships" on the keelson, and are braced together above "by the trussel-trees and cap."

In the twenty-second, for the futtock shrouds are substituted "wood or iron stays, which extend from the ends of the lower cross-trees to the upper part of the lower mast head."

The twenty-third relates to a method of fastening chain top-sail sheets. Two half shackles of iron are used. The first has at one end a "oblong square hole," at the other end a "round

“eye.” The second has at one end a toggle, at the other end a round eye. The two eyes are connected by “an intervening small link.” “When the two shackles are placed at right angles with each other, the toggle is inserted into the oblong square hole, where it will remain until some person unshackles it by raising the lower half shackle to a right angle with the upper half shackle, and then withdrawing the toggle from the oblong square hole.”

[Printed, 2s. Drawing. See Repertory of Arts, vol. 20 (*enlarged series*), pp. 247 and 289; Mechanics' Magazine, vol. 52, p. 318; Patent Journal, vol. 9, p. 142.]

A.D. 1850, January 26.—N° 12,945.

DE WARDIN, WINCESLAS, Le Baron DE TRAUX.—Looms, &c.

Amongst other matters a loom is described “for weaving broad and sail cloth.” In it the lay is worked by a crank. The treadles are worked by eccentrics on a longitudinal shaft which is worked by a bevel wheel from the cam shaft which makes two revolutions to one of the crank shaft. The picking and taking-up motions are worked by eccentrics fixed on the cam shaft.

The inventor also weaves linen and sail cloth by power, with dressed warps, and employs a weft which has been beaten after it has been “half bleached and dried.” An apparatus for this purpose is described, in which the weft is fed between two wheels over a block, while a stamper is caused to rise and fall upon it on the block by the action of a crank on a shaft above.

[Printed, 2s. Drawings. See Mechanics' Magazine, vol. 53, p. 96; Patent Journal, vol. 13, p. 30.]

A.D. 1850, January 29.—N° 12,953.

COLEGRAVE, FRANCIS EDWARD.—Springs.

Springs of various sorts are described, amongst others some applicable to standing rigging. For this purpose two square bars placed horizontally are connected by bolts sliding in holes in the bars. Each bolt has at one end a nut, and at the other an eye, and they are arranged so that some of the eyes are above and some below. The bars are kept apart by *springs coiled round the bolts*. The eyes which are above

are connected to the shrouds, and those which are below to the ship's side, so that the tension of the shrouds acts to draw the bars together, while this tendency is contracted by the springs.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 37 (*conjoined series*), p. 76; *Mechanics' Magazine*, vol. 53, p. 99; *Patent Journal*, vol. 9, p. 224.]

A.D. 1850, April 20.—N° 13,052.

CHAPMAN, JOHN TIMOTHY. — “Apparatus for setting up ships' rigging and raising weights.”

1st. “To facilitate the application of power for the purpose of tightening the shrouds and other rigging,” two blocks are employed, similar to “the wooden dead eyes now in use for the reception of the shrouds,” and furnished with sheaves for the reception of a lanyard. The upper block has an opening formed in it, and in this opening a small barrel or capstan is mounted, to which axial motion may be given by means of a worm wheel fixed thereon, and actuated by a worm turned by a crank handle. The lanyard having been connected to the upper block, and passed round the sheaves of both that and the lower block, is then coiled twice or thrice round the capstan. “When the rigging is to be set up or the shrouds to be made tight, one person takes hold of the free end of the lanyard which has been passed over the capstan, and another person works the capstan by means of the crank handle.” In a modification, the block and capstan are separate, and the spindle of the capstan is fitted with a square end which take into a hole in the block. Or the capstan may be fitted in any convenient position near the shroud block.

2nd. Improvements in “shrouds or purchase blocks.” According to this part of the invention, the capstan is connected to the lower block, and a ratchet and pall or two ratchets and two palls are employed to “prevent the capstan from running back during the operation of tightening the lanyard.”

3rd. The application of a “capstan apparatus or portable screw winch,” such as that already alluded to, for the purpose of raising weights, the apparatus being in this case furnished with a square spindle, which “should be inserted into a hole or socket formed in the mast or side rail, or some other convenient bearing point.” This capstan may be used for

hoisting sails. The blocks above described may also be used
 " as a portable tackle for setting up topmast rigging, or other
 " like hoisting purposes on board ship, where it is necessary
 " to exert great power without much labour."

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 53, p. 336; *Artis*
 vol. 8, p. 141; *Patent Journal*, vol. 10, p. 45.]

A.D. 1850, June 8.—N° 13,109.

NEWTON, WILLIAM.—(*A communication.*)—Applications
 caoutchouc.

Amongst the various applications is one for making a fabric
 suitable for ships' sails.

Two calendering rollers are placed in the same horizontal
 plane. Over one is stretched an endless apron of glazed cloth
 over the other an endless apron of felt, &c. A suitable pre-
 paration of india-rubber is spread on the glazed apron, and
 mass of fibrous material is introduced between the rollers, the
 action of which the fibrous substance is incorporated with the
 india-rubber, and a fabric produced, which may be
 vulcanised or not.

For ships' sails, cords, wires, &c. are cemented on a sheet
 of the fabric, or between two sheets thereof.

[Printed, 4d. No Drawings. See *Repertory of Arts*, vol. 20 (*enlarged series*
 p. 137, and p. 194 for Disclaimer; *London Journal (Newton's)*, vol. 41 (*a*
joined series), p. 33; *Mechanics' Magazine*, vol. 33, p. 476; *Patent*
Journal, vol. 11, p. 2.]

A.D. 1850,—N° 13,109.*

On December 7, A.D. 1850, a Disclaimer was filed by
 W. Newton of portion of the invention described in Specification,
 No. 13,109. This Disclaimer, however, does not refer
 any part of the invention connected with the present series.

[Printed, 4d. No Drawings.]

A.D. 1850, November 30.—N° 13,368.

CUNNINGHAM, HENRY DUNCAN PRESTON.—Reefing sails.

The yard is fitted to revolve in rings near its end. The
 rings carry smaller rings for the studding-sail boom, and eye
 bolts for lifts, top-gallant sheet blocks, &c. The booms
 their inner ends rest in goose-necks on the parral, and serve as
 chafing spars. If studding-sails are not used, a similar spar
 is fitted along the yard to prevent the sail chafing. The yard
 also revolves in a hoop fitted on the parral, and on it at its

centre is fitted a boss round which a chain or band passes, by hauling on which the yard is revolved and the sail wound thereon. The hoops of the parral are in two pieces, so that they can be opened to remove it from the mast, or half the ring may be of rope or chain. To admit of the sail being rolled up, it is slit down the middle, and a slip of canvas fitted with travellers which slide up and down ropes along the edge of the slot, adapted to cover the slit. "A lap-over piece is fitted to the top of the sail to cover the jackstay and prevent friction."

[Printed, 1s. 10d. Drawings. See *Mechanics' Magazine*, vol. 54, p. 468; and vol. 57, p. 441.]

A.D. 1851, January 16.—N° 13,456.

WATSON, FREDERICK.—"Sails, rigging, and ships' fittings."

A circular turn-table is fitted on deck. From this rises a frame carrying a horizontal rotating shaft. Arms radiate from a point on this shaft, and to them sails are fitted which may be set at such an angle that the wheel thus formed is revolved by the wind. Stays are led from the end of each arm to the ends of the arms on each side of it, and there are also stays from the arms led forward to a point on the shaft. The sails are adjusted by lines carried to a ring which slides on the shaft. A "balance sail or vane" is attached abaft the framework for the purpose of bringing the sails into the wind. Motion is communicated from the main shaft by suitable gearing to paddle wheels or other propellers.

[Printed 10d. Drawing. See *Mechanics' Magazine*, vol. 55, p. 77; *Patent Journal*, vol. 11, p. 207.]

A.D. 1851, October 30.—N° 13,792.

SCOTT, MICHAEL.—Ship-building.

Besides other improvements, the invention relates to a new construction of iron masts. Two concentric tubes are formed of thin iron plate. These are joined by vertical ribs. The ribs are formed of two plates rivetted together; one plate is flat, and the other has corrugations in it, so that when the two are rivetted together there will be spaces formed by the corrugations through which rivets may pass through and attach the two tubes to each other and the ribs.

[Printed, 2s. 10d. Drawings. See *Repertory of Arts*, vol. 19 (enlarged series), p. 333; *Mechanics' Magazine*, vol. 56, p. 376.]

A.D. 1851, December 4.—N° 13,840.

MACINTOSH, JOHN.—Propelling and rigging vessels.

The mast is pivotted so that it may heel over sideways at an angle from the perpendicular and thus when the vessel is on a wind the sails may "become lifting as well as propelling sails." To the same end, "the head sails or other jib-formed sails " may be hauled to windward without inclining the mast," by means of a guide on the yard on which a block "attached to " the halyards" may travel.

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 476; *Engineers' and Architects' Journal*, vol. 15, p. 237.]

A.D. 1851, December 19.—N° 13,875.

LAMPORT, CHARLES.—"Reefing sails."

A tube is fixed along the yard and the sail is secured between the tube and yard by lugs on the tube which pass through holes in the sail and are fastened to hoops encircling the yard. In these hoops are slots into which the lugs pass and are secured behind by pins, the portion of the yard behind each hoop being hollowed out to receive the pin. A chain passes along the tube. In the centre of the yard is an opening in the tube and a pair of pulleys; here the chain has fastened to it another chain by which it can be hauled on. The outer ends of the chain lead over pulleys at the ends of the yard and are made fast to cringles on the leach rope, a sufficient distance down to allow for a reef. At intervals along the tube are openings through which reefing lines pass out. These are secured to the chain in the tube and pass through thimbles in the sail to a line on a level with the reef cringle, where they are sewn to the sail. To reef the sail, the chain is made fast and the yard lowered, when the lines gather up the sail against the yard. For further security the ordinary reef points may be used if preferred. If a second reef is needed, a similar apparatus is placed on the opposite side of the yard. The sail may also be reefed at the foot by attaching a bunt-line across it, and lacing a cord through thimbles thereon and round the foot of the sail. By hauling on this cord and lowering the yard the sail is reefed.

[Printed, 8d. Drawing. See *Mechanics' Magazine*, vol. 56, p. 511.]

A.D. 1852, February 23.—N^o 13,975.

LACON, WILLIAM STIRLING.—“Improvements in the means
“ of suspending ships’ boats, and of lowering the same into
“ the water.”

The object of this invention is, that the boats “may be
“ readily lowered and put to sea without the risk of the
“ tackles or other contrivances which connect the boats to the
“ ship retarding the operation of lowering and floating them
“ clear of the ship.” To this end the boats are suspended
“ from chains or ropes which pass over the davits of the ship,
“ and thence down to a winch or windlass round which they
“ are wound, but are attached thereto in such a manner that
“ when the winch is free to revolve, the ropes or chains will
“ unship or disengage themselves from their attachment by
“ their own weight.” An arrangement is described in which
the chains or ropes, by which the boat is suspended, are
connected to two conical barrels mounted on a shaft in bearings
placed above the deck of the vessel. This shaft is furnished
with a ratchet wheel, with which a catch connected to a lever
operates so as to keep the boat suspended at the proper height,
and on the shaft is also a friction pulley round which a friction
clip is passed, so that it may be tightened thereon by means
of a lever. When it is required to lower a boat, the catch is
removed from contact with the ratchet wheel, the friction clip
being tightened so as to control the action of the apparatus.
The boat then descends by its own weight, and when it arrives
at the water, the ropes or chains leave the barrels and so set
the boat free from the vessel, each rope or chain being merely
connected to its barrel by being looped upon a curved pin
projecting from the small end thereof, from which it easily
passes when uncoiled therefrom. The boat may be raised
again to its first position by a winch and wheels operating
upon the shaft, or by handspikes inserted into openings in the
barrels.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 41 (*con-
joined series*), p. 185; *Mechanics' Magazine*, vol. 67, p. 196; and vol. 58,
p. 229; *Engineers' and Architects' Journal*, vol. 15, p. 113; *Artizan*, vol. 10,
p. 71; *Practical Mechanics' Journal*, vol. 5, pp. 12 and 135.]

A.D. 1852, February 23.—N^o 13,981.

BROOMAN, RICHARD ARCHIBALD.—(A communication.)—
Windmills.

A "windhouse" is used of an octagonal or other form, within which the "revolving part of the mill" is contained. This is fitted with vanes, and the outer part of the "windhouse" is made with funnel shaped openings, to guide the wind to the vanes. This windmill may be used on board ship, but then the "windhouse" is dispensed with.

[Printed, 8d. Drawing. See *Mechanics' Magazine*, vol. 57, p. 196.]

A.D. 1852, May 22.—N° 14,130.

ROBERTS, RICHARD.—"Boats, ships, and other vessels."

A method of raising and lowering ships' boats is described. The davits are square and have hollow uprights. Through the uprights are led the ropes from the blocks at the ends of the arms. They pass down and round a block attached to a piston working in a cylinder below the water line. Thence they lead to a winch by which the boat is lowered. Before the slings are put on the boat the piston (which moves loosely in the cylinder) is let down to the bottom of the cylinder, and held there by a catch. When the boat is being lowered, this catch is let go, and the piston rises gradually through the cylinder, the water as it flows from one side of the piston to the other checking its progress, and consequently the fall of the boat.

Along each side of the boat is a sliding bar. On each bar are two bolts which slide through plates at right angles to the bar. The two bars are connected by a cross bar on which is a spring, by which the bars are drawn back and consequently the bolts drawn through the plates. By means of a lever the bars may be drawn forward and the bolts drawn through the plates, so that the slings can be hooked on the bolts, where the friction holds them. When the boat reaches the water, the pressure of the hooks on the bolt is removed, the spring draw back the bolts and the boat is released. Small springs against the ends of the bolts prevent the hooks slipping off.

When iron masts are used, the mast is rivetted to a bulk-head, and with wooden masts, an iron socket is rivetted on in a similar way, and it receives the foot of the mast.

[Printed, 3s. 2d. Drawings. See *Mechanics' Magazine*, vol. 57, p. 137.]

PATENT LAW AMENDMENT ACT, 1852.

1852.

A.D. 1852, October 1.—N^o. 64.

FANSHAWE, HENRY RICHARDSON. — Sails, sail-cloth, and other articles; also a loom for weaving the same.

The various articles enumerated, among which are sails, are woven in a loom which "has a harness similar in all respects to the ordinary harness, only that the form of the frame" is to be of any curve required, "each row of harness being connected with its own hoop," and the shuttle "being arranged to travel within the hoop harness and the warp threads being fastened within the said harness."

Sails are made "of circular or oval form, leaving a corresponding opening in the centre thereof or several openings, arranged concentrically, for the purpose of allowing of the adoption of a wind valve or valves," which may be adjusted so as to allow of the wind escaping to any required amount. "This wind valve is to be formed by placing a circular or oval piece over such opening, and securing it by a 'lap seam.'" Or "curvilinear or combined curvilinear and angular pieces" may be woven and jointed to form a sail, either by stitching or by a "lap seam." The stitching is to be "at intervals only, thus leaving air spaces in the sail, and in this unstitched or unsewn portions of the sail" holes are punched "through the two substances," and there is laid "upon each side of the seam a strip of caoutchouc 'paste,' rolled out for the purpose, just the width of the 'lap,' the same having been previously 'primed,' or coated with liquid indian-rubber." The seam is then hot-pressed so as to "cause the compound to join or unite at the preparations." The india-rubber is then exposed to heat and vulcanized, a suitable proportion of sulphur having been originally added for that purpose.

[Printed, &c. Drawing.]

A.D. 1852, October 1.—N^o 119.

ENNIS, GEORGE.—(*Provisional protection only.*)—"Gaffs
"and booms."

The jaws of gaffs, &c., are constructed separately and jointed to the gaff instead of being fixed to it. On the jaws which fit the mast are two lugs carrying a pin. The gaff has at its end a metal stirrup with holes through which this pin passes so that the gaff plays on a vertical hinge. Close below this stirrup is a "swivel collar" to which the main halliard is attached.

[Printed, 6d. Drawing.]

A.D. 1852, October 11.—N^o 340.

DEWY, HENRY.—(*Provisional protection only.*)—"Dis-
"engaging ships' boats from their suspending chains or
"ropes."

The following is the Specification :—

"The object of this invention is to attach the chains or
"ropes whereby a ship's boat is suspended from the davits
"in such a manner that the lower ends of the chains or ropes
"may be easily and quickly disengaged from the boat the
"moment the latter touches the water, thereby allowing the
"boat to drop off from the vessel without danger.

"The improvement consists in a peculiar construction of
"fastenings, of which two or more are placed in the bottom
"of the boat, and to which fastenings the chain or other
"tackles are connected by hinges through which passes a
"swivel pin belonging to each of the fastenings.

"These swivel pins are held in their proper position by
"cross pins connected to a rod, which extends along the boat
"and connects both the fastenings together, so that by merely
"pulling back this rod both the swivel pins are released, and
"the rings at the ends of the chains or ropes are allowed to
"pass off of them and release the boat. In order to prevent
"the boat from canting over to one side, I use lateral chains
"with small rings at their lower ends; these chains pass
"from the central suspending chains to eyes fixed near the
"gunwale of the boat, and after passing through these eyes
"they are carried to the swivel pins which pass through the
"rings of the suspending chains, so that when the swivel
"pins are released, all the rings of the suspending chains and

“ lateral chains pass off together and release the boat. The
 “ other ends of the suspending chains pass over pullies
 “ connected with the davits, and are both secured to the
 “ barrel of a winch, so that when the boat is required for use
 “ it will only be necessary to turn the winch barrel in the
 “ ordinary manner, and the two suspending chains will be
 “ unwound simultaneously.”

[Printed, 4d. No Drawings.]

A.D. 1852, October 12.—Nº 345.

PERKES, SAMUEL. — (*Provisional protection only.*) —
 “ Navigable vessels and propellers.”

After describing various improvements in ships’ hulls, &c.,
 the inventor proceeds :—

“ Also I next propose to construct timber vessels and chief
 “ masts upon, and apply thereto, similar principles as invented
 “ by me and claimed under Protection of Inventions Act, 1851,
 “ for my provisionally registered mode of constructing beams
 “ for bridges, buildings, keels, masts, &c., as by this means
 “ an entire vessel, both hull, decks, beams, diagonal braces,
 “ &c., &c., can be constructed from stem to stern as of one
 “ entire and solid mass, and which will give greater strength
 “ than any other known principle, as the whole body is com-
 “ posed of laminated thicknesses set edgeways, and the fibres
 “ crossed at every possible angle and direction.”

“ The next arrangement I propose is for the application of
 “ certain kinds of sails, which I would compose of metals or
 “ wood or other suitable material, on the principle of jelousies
 “ or Venetian shade blinds, and construct them in suitable
 “ and strong frames or otherwise, and in certain cases cause
 “ the whole to revolve around the main or other masts on a
 “ bed plate of iron or other material, and to be worked by
 “ hand wheels, or cogs or otherwise, as required, and efficiently
 “ stayed thereto. These descriptions of sails can be raised
 “ or lowered, or set to any angle or point of the compass, at
 “ pleasure, with greater speed and ease than ordinary sails
 “ can be operated upon.”

The inventor also employs windmill sails to actuate pro-
 pellers.

[Printed, 4d. Woodcuts.]

A.D. 1852, October 16.—N° 417.

PUIS, PIERRE AUGUSTIN.—“Chain or cable.”

The chain is principally intended for use in mines in connection with a drum the sides of which it fits. It also “can be applied for standing rigging of vessels, and for such purposes it may be composed of one bunch of straight iron wires fastened by ligatures and divided into links; the articulations are joined one to the other by means of a single wrought-iron pin, having to each of its ends a head, serving to keep the wires in their proper position.”

[Printed, 1s. Drawings.]

A.D. 1852, December 6.—N° 976.

NORMAN, JOHN.—Making and setting square sails.

The object is to get the sails flatter than usual. For this purpose additional sheets are attached to the lower bolt rope of the sail and brought through thimbles or blocks on the yard down to the deck. Extra canvas is added below the sail shaped into “a number of arches” to the edge of which an additional bolt rope is fastened, the extra sheets being affixed at the points of the arches.

Or a number of small lines may be attached to the lower bolt rope and brought together to the additional sheets.

[Printed, 6d. Drawing.]

1853.

A.D. 1853, February 7.—N° 334.

BROOMAN, RICHARD ARCHIBALD.—(*A communication.*)—“Sail hanks.”

These are improvements upon the ordinary wooden hanks used for securing stay-sails, jibs, &c., to the stays. A metal ring has upon it a number of friction rollers. This is for the stay to pass through. Attached to this ring is a smaller one which opens, and can be closed and held firm by a screw. *This ring is put through the eyelet of the sail, and screwed*

fast; there may be an eye in the bolt connecting the two rings through which the halliard may run.

[Printed, 8d. Drawings.]

A.D. 1853, February 18.—N° 425.

CLOUGH, CHARLES BUTLER.—(*Provisional protection only.*)

—Lowering boats.

The following is the whole Specification :—

“My invention consists of a hook capable of turning upon
 “a pivot mounted in a shackle, and weighted or connected to
 “a weight in such a manner that the falling of the said weight
 “shall cause the hook to cant over. This hook may be
 “attached to the ends of the tackle for lowering a boat from
 “a ship’s side, being hooked into a ring bolt or staple at the
 “bow and stern of the boat. As soon as the boat touches
 “the water, the strain or stress upon the hooks is thereby
 “removed and the weight falling causes the hooks to “cant”
 “over, and disengage themselves from the ring bolts or staples,
 “and the boat is thus cast loose. If preferred, the weighted
 “hooks and shackles may be fixed to the bow and stern of
 “the boat, and links or rings at the ends of the tackle hooked
 “on to them. When employed for mooring vessels, the
 “hook and shackle should be attached to the pier or other
 “mooring, and a ring or loop upon the end of the hawser
 “passed on to the hook. So long as a strain or stress is kept
 “upon the hawser, the hook will ‘hold fast;’ but as soon as
 “it is desired to ‘cast off,’ the hawser must be slackened,
 “the weight will then ‘cant’ the hook over, and disengage
 “the hawser from the moorings.”

[Printed, 4d. No Drawings.]

A.D. 1853, March 11.—N° 617.

SUMMERS, JAMES.—Sails.

The improvements relate to main-sails for cutters, sloops, schooners, &c., try-sails, and fore-and-aft sails generally. The object is to prevent the sails “bagging.” “Such sails are to
 “be so constructed that there shall be a diagonal line of
 “junction of the parts thereof from the ‘throat’ (at the
 “head of the sail) to the ‘clew’ (at the foot thereof,) the
 “lengths of cloth running from each side of said line of

“fitted up, to work on a fixed centre; and from the lower end of this lever a rod of iron runs along in guides, at the side of or beneath the keel, or along any other convenient part of the boat. This rod carries catch pins, or detents or pins so contrived that they shall form the connection between the terminal rings of the loop lengths of chain or rope. In this way the boat may be easily elevated, and swung out-board by the hand working the ropes, or by the winch or winding barrels, and by the swinging round of the upper parts of the davits; and, when in the water, to which it is thus let down on an even keel, the party inside draws the lever at the stern, and, disengaging the chain links, completely releases the boat.”

[Printed, 4d. No Drawings.]

A.D. 1853, April 5.—N° 814.

LONG, JAMES.—(*Provisional protection only.*)—Setting-up ships' rigging.

The shroud is passed under a sheave and made fast to the end of a screw. This screw passes through a rail through which the shrouds are rove and has on its other end a nut, by the action of which the shroud is tightened. The screw, &c. may be boarded over when the shroud is set up.

[Printed, 6d. Drawing.]

A.D. 1853, April 13.—N° 895.

CLIFFORD, CHARLES.—“Lowering boats evenly, and preventing them filling with water.”

This invention “consists of a mode of combining apparatus and ropes, in order to facilitate the lowering a boat. A barrel is placed under one of the seats, having two holes therein. Three ropes are employed; one rope, which, being passed through the barrel and firmly secured therein, is wound round it. The other two ropes are fixed to the ordinary davits or apparatus at the ship's side; they pass respectively through two blocks (each having three sheaves, which may or may not rotate on axes), and then enter one hole in the barrel in opposite directions; they are otherwise left unfastened. The two blocks are fixed to diagonal ropes, which are made fast on either side of the boat. By

“ this arrangement, when the first rope is pulled, the barrel rotates, and winds up the other two ropes to any required elevation ; the first rope is then made fast to hitch pins, or otherwise, in the boat. The lowering is effected by paying off the first-mentioned rope, thus allowing the barrel to rotate ; and as soon as the boat has descended, and moved to a distance equal to the length of the two ropes, they will be drawn out of the holes and through the blocks, and the boat will be free. Or the barrel may be otherwise placed.”

The remainder of this invention does not refer to this series.

[Printed, 10d. Drawings.]

A.D. 1853, April 20.—N° 957.

HARRIS, Sir WILLIAM SNOW.—“ Lightning conductors for ships and vessels.”

The object of the invention is to provide a method of carrying the conductor outside the vessel into the water, instead of through the hull. The conductor down to the lower-mast-head is fitted in the usual way, and consists of a series of plates fixed on the upper masts and fitted with the usual appliances for preserving electrical contact when the masts slide on one another. From the lower-mast-head, the conductor is continued along the shrouds. It consists of a series of rods, each pair of which is connected by a tube, into which the ends of the rods pass. This tube is lashed to the shroud and as the ends of the rods slide up and down within it, it allows a certain amount of play for the alteration of the length of the rigging. From the ends of the shrouds the conductor is carried down the side of the hull, till it reaches the sheathing, to which it is secured.

[Printed, 6d. Drawing.]

A.D. 1853, May 11.—N° 1170.

MATTHEWS, ABRAHAM.—(*Provisional protection only.*)—

“ Disengaging boats from ships or other vessels.”

“ The improvements relate to applying disengaging means to the fixings connecting the supporting means, or the ‘ tackles,’ with the boat, by which, when the boat is lowered or being lowered by the ‘ tackles,’ or whilst otherwise sus-

“ pended at the ship’s side or elsewhere, all connection between
 “ the boat and such suspending means may at once be released,
 “ and the boat allowed to descend to the water.

“ Suitable catches or fastenings carried by the boat hold the
 “ ends of ‘tackles’ or other supporting means, and these
 “ catches or fastenings are so arranged and connected together
 “ as to be capable of simultaneous movement by a lever or
 “ otherwise, to release the boat at the instant required.”

“ The catches or fastenings which unite the supporting
 “ means, that is the ordinary ‘tackles’ or other like supports,
 “ with the boat, are each capable of a sliding (or jointed)
 “ movement, in order at any instant to release the boat from
 “ its supports & its connection with the ship. And whatever
 “ be the number of catches used they are all connected
 “ together to be acted upon at the same time, in order that
 “ the boat may at every supporting part be simultaneously
 “ released.”

[Printed, 4d. No Drawings.]

A.D. 1853, May 14.—N° 1190.

RUSSELL, GEORGE FITZJAMES.—“ Disengaging, lowering,
 “ and raising ships’ boats.”

The boat, when not in use, is supported by “keel rests,” which project from upright rods hinged at their lower ends to the bulwark of the ship. These rods are held in a vertical position by the chains to which the boat is connected, these chains each being fastened at one end to the upper part of one of the rods, then passed down through a block from which the boat is suspended, then carried up and over a pulley at the upper end of the rod, then over a pulley mounted upon a fixed upright rod, and then down under another pulley and to the barrel of a “winding apparatus,” on which a portion of each chain is coiled. The barrel of this winding apparatus is turned by a winch and wheelwork, and furnished with a ratchet wheel and pall and a break, by means of which the apparatus is held in any desired position. When it is required to lower the boat, the chains are slackened by turning the barrel, and allow the rods which are hinged to the vessel to move outwards for a certain distance at their upper ends; also by bringing the “keel rests” into a standing position, they cause the boat

to leave them, the lowering of the latter being then continued until it rests on the water, when it is disengaged by means of a lever connected with apparatus for moving catches, and so releasing the boat.

[Printed, 1s. Drawings.]

A.D. 1853, May 30.—N° 1328.

WYMER, FRANCIS WILLIAM. — (*Provisional protection only.*)—"Improvements in raising and lowering ships' boats, and in the apparatus connected therewith."

The following is the whole Specification :—

"According to this invention the davits are so contrived
 "that after the boat is hoisted up to them they are made
 "to turn over in board by means of worm wheel or other
 "gearing. For this purpose, according to one method of
 "carrying out the invention, each davit is keyed into a socket
 "formed radially in a large worm wheel which turns in
 "suitable bearings in the ship's bulwark or side. The worm
 "wheel is worked by a worm or endless screw, the spindle of
 "which passes down at an angle convenient for the appli-
 "cation of manual force to cross handles fixed on it. The
 "davits are made to stretch across the boats, and have
 "projections embracing either gunwale. When, for example,
 "the boat has to be raised, it is brought immediately under
 "the davits, which stretch out horizontally, and is hoisted
 "up to them by means of tackles in the usual way, sheaves
 "being fitted to the davits immediately over the centre of the
 "boat for that purpose. The boat may then be lashed to
 "the davits if necessary. Manual force being then applied
 "to the worm handle, the davits are made to turn through
 "half a circle, necessarily carrying and turning over the
 "boat along with them, the whole finally resting on the
 "poop deck house or other support provided for it in board.
 "When the boat is to be lowered, the reverse of this process
 "is gone through."

[Printed, 4d. No Drawings.]

A.D. 1853, June 23.—N° 1526.

STOCKS, GEORGE LOUIS, and WATSON, THOMAS.—(*Provisional protection only.*)—"Constructing and reefing square sails,

"A roller is suspended from the lower fore quarter of the yard at each end thereof, and also in the centre," "and at each end of the roller is a metal worm travelling in contrary directions, with a fair leader on each metal worm.

"The sail is attached to the roller by a jack stay. A triangular portion of the centre of the sail is cut out, and the vacant space in the sail caused thereby is filled up by a distinct triangular sail, which is hereafter called the centre sail. Ropes or chains are attached to the edges of this triangular sail, and also to those edges of the main sail which adjoin those of the triangular sail, and these ropes or chains lead to the deck abaft the sail. On the chains or ropes clamps or grooves travel suspended from the roller through which the chains or ropes travel upwards with the sail to the roller. The centre sail remains stationary until the main body of the sail is reefed, when it may be reefed to a yard to which it is attached. On the outer edges or leaches of the main portion of the sail is a chain or rope which travels through a clamp or groove attached to the fair leader, and keeps the sail properly adjusted whilst being reefed. The sail is reefed by means of a small lever purchase under the slings of the yard, worked by two ropes from the deck."

[Printed, 6d. Drawing.]

A.D. 1853, July 1.—N° 1585.

GETTY, JOHN.—Ship-building.

No part of the Final Specification refers to this series, but in the Provisional the following passage occurs:—"Constructing masts of vessels used for navigation with a combination of timber and iron, by forming the centre of the mast with plates of iron placed at right angles to each other, and filling the spaces forming the quadrants with timber, and connecting the whole by iron hoops or clips or any known means."

[Printed, 6d. Drawing.]

A.D. 1853, July 8.—N° 1631.

SAXBY, STEPHEN MARTIN. — "Apparatus for lowering ships' boats, and for holding and letting go tackle."

According to the first part of this invention, the boat is suspended by two ropes, which are each connected at one end to the upper end of one of the davits, each rope thence passing down to a block which is connected by suitable means to the boat, thence upwards and over a pulley at the upper end of the davit, and thence downwards to a drum, of which two are fixed upon a horizontal shaft mounted in suitable bearings above the deck of the vessel. The davits are "in the form of cranked levers" hinged to the ship's side, so that as the boat descends they fall outwards and guide it off the ship's side. When the boat is not required for use it is kept in position by a ratchet wheel on the shaft with which a pall acts, and, when the boat has to be lowered, this pall is placed out of action, and the descent of the boat controlled by a "friction strap" passed round a third drum on the horizontal shaft. The davits are mounted on pivots, and turn thereon when the boat is lowered, so as to place the latter clear of the vessel. The boat is released from the vessel by disengaging a rope which forms a connection between blocks attached to the boat and the blocks of the lowering tackle.

Another part of the invention consists "of a stopper cleat or lever nip" which is composed of "a pulley pivoted eccentrically, such eccentricity producing a surface of increasing radius, so that a rope or chain passing between it and a fixed surface will allow of such rope or chain running through in one direction, but in the opposite direction any strain upon the rope will increase the nipping or holding action of the cleat by forcing the increasing radii of the eccentric pulley more closely against the fixed surface." Various applications of this "stopper-cleat" are described, including the employment thereof in disengaging a boat from its tackle when lowered. In this case there is a "wedge key" which holds the pulley fast. This is attached to the ship by a line of such a length that when the boat reaches the water, the key is withdrawn. This cleat may also be used for the running rigging, and for other purposes.

[Printed, &c. Drawing.]

A.D. 1853, July 19.—N° 1711.

BRIMS, DONALD.—"Safety apparatus for the protection and preservation of life on water."

A vessel is described which is roofed over, so that it may be worked almost entirely from within. It has a single mast with a sprit-sail. The mast has a universal joint a short way up it, and may be folded down along the deck and lie in a crutch at the stern. It has a stay made fast to a cleat which can be let go by starting a screw from inside. A tube fits over the joint when the mast is hoisted, and this can be worked up and down by a rack inside the vessel. The sail is bent on the mast with toggles. The halliard is made fast on the outside of the boat. For tacking there is an endless chain passing over drums which can be actuated by shafting from below. To this chain the sail is attached.

[Printed, 1s. Drawings.]

A.D. 1853, July 22.—N° 1734.

RYLANDS, MARY ANN.—(*A communication from Joseph Rylands.*)—"Yards and spars."

The invention "consists of dividing a stick of timber (which " is shorter than the desired yard or spar) longitudinally, and " causing the two thick ends to be overlapped and dowelled " and hooped together. The two outer ends being made up " by scarfing pieces by dowells and hoops." It is preferred that the root end of the timber should come into the centre of the yard, &c., and the upper end outwards towards the ends. The timber is preferably not squared.

[Printed, 6d. Drawing.]

A.D. 1853, August 16.—N° 1914.

FINCH, EDWARD, and LAMPORT, CHARLES. — "Masts and " rigging."

"The improvements consist of applying tee or angle iron " vertically, and rivitting thereto firm plates to form wrought " iron masts. And in order to get rid of a mast with facility " when circumstances require it, the mast is made to separate " above the deck, the parts ordinarily being fixed securely " together with flanches, screws, and nuts, with slotted " passages and locking parts, so that by a partial rotation the " upper part of the mast may be separated. The upper part " of the mast has a plate introduced to enable the part above " to be formed suitable for receiving a top mast, and such " plate sustains the trussel trees and the foot of the top mast.

“ The mast is formed with a recess to receive the top mast, and to allow of its being shipped and unshipped without disturbing the hoop through which it is made to pass. The shrouds are attached to different parts of the mast, from the cap to the truss hoop of the lower yard by means of shackles and eyes, so as to distribute the support over that portion of the mast subject to transverse strain, and to avoid the chafing of the foremast shroud when the yard is braced sharp up, to prevent the liability to rot from the huddling together of the shrouds at the hooding, and to allow the shrouds to be more easily detached when required from the foot. To allow a certain degree of oscillation in the mast without unnecessarily taxing the material or construction of parts, and which oscillation is essential to a column supported by a partially elastic material, as rope, a yielding buffer or cushion of vulcanized india-rubber or cork or other elastic material is introduced at the mast partners, so that the mast may vibrate from the foot as much as the shrouds stretch, and collapse from the movement of the ship and the pressure of the sails without straining the mast. And to introduce a ball and socket joints at the foot of the mast to attach to the keelson to allow the mast to oscillate as the rigging expands, and as the elastic material of the partners gives way. And whereas hitherto the topmasts of ships have been housed or fixed to the foreside of the mast head, and require that the truss of the lower yard shall be detached, and the yard otherwise temporarily secured, to allow the said topmast to be lowered; it is intended to fix them to the after side, whereby greater strength will be secured in the mast head by having more metal to resist the crushing strain, in place of having the mast to resist tension; more ease in raising and lowering them by not interfering with the attachments of the yard; and when the mast rakes considerably by allowing them more readily to fall into their place.”

[Printed, 1s. 4d. Drawings.]

A.D. 1853, September 5.—N° 2042.

CLARE, JOHN, junior.—Construction of iron houses, vessels, &c.

Amongst the various matters dealt with in the Specification, several methods of constructing iron masts are given.

A mast may be made with a "rolled iron frame," having radial plates cased with wood, and with iron hoops at each joint.

Masts may be made of T-iron "with flush butts and angle iron pieces to secure the butts of plates." Also of "flanged plates," and each mast "capable of being lowered into and raised from its corresponding part between decks by hydraulic power." In the drawing the lower part is represented without any flanges inside the tubes, and with plates outside overlapping the joints.

A "metallic yard cased with wood" is shown, "with studding sail booms made to ship inside."

An iron mast may be made "with flanged plates and angle iron stays rivetted to the sides of plates." The stays pass diagonally from side to side within the mast.

A mast is shown "with T-iron rings, the plates butting at centre rib of T-iron," also "with flanged plates and flush butts, with angle iron strengthening the plates at each butt."

There is also shown "a metallic mast cased with wood, the flanges projecting outwards to receive the wood," and "being secured with rivets or nuts and screws, and iron hoops."

[Printed, 6s. Drawings.]

A.D. 1853, October 4.—N^o 2266.

DODGE, JOSEPH THOMAS.—(*Provisional protection only.*)—"Rigging and working the sails of yachts, ships, and other vessels."

"The improvements relate to forming the sails or their upper parts triangular, and to so arranging them that when it is required to shorten sail, this may be done from the lower parts by reefing or furling those parts to the extent desired; also to keeping the sails distended or flat by attachments at frequent intervals to the yards or booms; also to the means of suspending the yards or booms upon swivel or centre pins, to facilitate their movements and stowage as required, and to lacing the sails so as to facilitate the reefing."

The sail is attached to the boom or yard by means of a rod passing through eyes and rings.

There is also a method of facilitating the stowage of the boom by unshipping it not explained at length.

There is a "swivel or truss connection of yard with the mast," by aid of which the yards may be turned up alongside of the mast.

"An outrigger or breaster for the purpose of staying the rigging" is used, "to which is attached ropes or rigging."

[Printed, 1s. 8d. Drawings.]

A.D. 1853, October 18.—N^o 2399.

STOCKS, GEORGE LOUIS.—Jackstays.

Instead of the hoops or jackstays used for bending the sail, metal hanks are employed which slide in a groove formed in the mast or on T-iron fixed along it. The same means may be employed for fastening the sail to the gaff. The gaff may also have a "goose-neck," which slides in the groove, and a saddle which slides in rails parallel to the groove. On the top of this saddle is a ring for the throat halliards. The gaff has in this case no jaws. The invention is also figured as applied to a topmast, and in this case "the yard is attached to the double T-iron by means of a peculiar form of parral," of which no description is supplied. From the sketch of it given, it appears to consist of an ordinary rope parral to be attached to the yard as usual, and carrying at its ends clamps which would slide over the iron.

[Printed, 8d. Drawing.]

1854.

A.D. 1854, February 4.—N^o 281.

NEWALL, ROBERT STIRLING.—"Setting up ships' rigging."

A metal lanyard is used, which is composed of three plates forming two cheeks and a tongue between them, all having corresponding holes, through which a pin is placed to keep them together. According to the improvement the holes in

the tongue are a greater or less distance apart than those in the cheeks, so that a greater nicety of regulation may be obtained.

For ascertaining the strain used in setting up the rigging a weighted lever is used, the end of which is placed in the lowest hole of the tongue, while the rigging is drawn down by a chain attached to the lever and hooked above the cheeks.

[Printed, &c. Drawing.]

A.D. 1854, March 7.—N^o 545.

RIXON, FREDERICK.—(*Provisional protection only.*)—"Apparatus for lowering and disengaging ship's boats."

The inventor gives the following as the whole description:—

"This invention relates to an arrangement of apparatus which will admit of a boat suspended from the davits of a ship being lowered by one or more of the boat's crew, and of being disengaged from the ship immediately it touches the water. To this end I cause the davits to work on a hinge joint, and I connect their extremities together by a cross bar, thus forming a kind of swing frame. At about the middle of the length of this cross bar I insert pulleys or blocks to receive a length of rope or chain, which passing also over other blocks or pulleys connected to or carried by a standard affixed to the bulwarks of the ship, sustains the boat and the apparatus in its elevated position. One end of this rope or chain is secured to the cross bar or swing frame, and the other to a barrel mounted in brackets on the swing frame.

"On the axle of this barrel is a winch handle for turning it, and winding up or letting out the rope, and on the same axle is likewise a friction pulley for receiving a friction strap which, when tightened up, will prevent the barrel from turning. Carried by brackets from the swinging frame is a shaft, the ends of which are hooped to receive eyes, forming the terminals of the chains by which the boat is suspended. By working this shaft when the boat is lowered, by means of a lever with which the shaft is provided, the hooks are disengaged from the eyes of the chain, and the act of disconnecting the boat from the ship is instantly effected."

[Printed, &c. No Drawings.]

A.D. 1854, March 16.—N° 632.

CAVANAUGH, JAMES.—“Improvements in sails for navigable vessels, and in the apparatus for working them.”

The following is the whole of the Final Specification :—

“This invention consists of a vertical roller mounted on suitable bearings, on which the sail is wound when not in use ; when the sail is required to be reefed (or reduced) it is partially rolled up on the roller.

“In adapting this invention to square sails, a roller suitably mounted, the length of which is regulated by the height of the sail to which it is attached, is placed parallel to and on front or round the mast. The middle of the square sail is made fast to the roller, so that when it, the roller, revolves, the sail is drawn in from both sides and wound round the roller. The sail is not laced to the upper yard as now practiced, but held out by ‘sheets’ as on the lower yard, and is kept to the upper yard by suitable ‘travellers.’

“It is proposed to work these rollers from the deck, round-top, and cross-trees of the vessel by wheels, and pinions, and leading gear, or any other suitable mode.

“In applying this invention to ‘fore and aft sails’ they are secured by their fore edge to a vertical roller placed parallel to and just aft the mast.

“The yards are suspended by a suitable apparatus, its movements being as a universal joint, to answer the working of the vessel.”

[Printed, 4d. No Drawings.]

A.D. 1854, April 11.—N° 855.

JAMES, WILLIAM HENRY.—“Marine and other structures.”

The improvements are applicable, amongst other purposes, to the construction of masts, &c.

They relate in the main to the same subjects as No. 10,784, A.D. 1845, and No. 14,283, No. A.D. 1852, in neither of which Specifications is any mention made of any matter connected with the present series.

In these Specifications there is “detailed a method of uniting together metallic plates for the formation and manufacture of cellular plates by means of a series of dovetailed partitions running into corresponding parallel grooves,

“ formed in the said plates by rolling and planing machines adapted for the purpose ; the end or side openings of the cellular plates so formed being welded to intervening bars of metal, so as to render them steam and water tight under very high pressure,” “ without the necessity of such plates being perforated ” for bolts, screws, &c. “ The variations, additions, and new applications of this improved method ” consist in binding together by similar dovetailed partitions any number of plates placed one above another, formed with corresponding projections and grooves ” on their surfaces. The plates may also be connected by forming suitable grooves in which bars of corresponding form may slide, or into which molten metal may be poured. The plates may be formed with grooves by means of corrugated rollers or by stamping machines. For this purpose an “ aërial antagonistic stamping machine ” may be employed. In this machine two weights are suspended one above the other, by various means, so that they may meet and strike one another without the concussion usual in machines with a fixed anvil.

[Printed, 6d. Drawing.]

A.D. 1854, May 10.—N° 1039.

FULLER, WILLIAM COLES. — “ Adaptation of indian-rubber springs.”

Among the springs described is one suitable for attachment to the running rigging and for other purposes. An iron frame is fixed on the deck or to the side of a ship. The top of this is formed of an iron plate with a socket, through which passes a rod with a ring or hook at its end. On the rod below the plate are placed a number of india-rubber washers and below them a plate is secured to the rod. By this arrangement any strain on the ring is transferred to the india-rubber.

[Printed, 10d. Drawing.]

A.D. 1854, June 2.—N° 1224.

ALDBOROUGH, BENJAMIN O'NEALE, STRATFORD, Earl of. — “ Locomotion on land and water.”

An improved vessel is described to which is to be attached an aërostat of the same construction as that described in No. 224, A.D. 1854. This aërostat is furnished with wings to be

worked by manual or other power, and these wings may also be acted upon by the wind like sails. The masts on which the aërostat and its wings are mounted may be jointed to the hull, or preferably may slide in grooves fore and aft of the vessel. They may have "double stems." The lower portions of the masts are preferably of tubes sliding one within the other.

[Printed, 1s. 10d. Drawings.]

A.D. 1854, June 3.—N° 1233.

LENOX, THOMAS.—(*Provisional protection only.*)—Reefing topsails, jibs, &c., from the deck.

The whole Specification is thus given :—

"By reefing or taking in canvas on the foot and stay of
"topsails and jibs, instead of the present plan, of tying
"points and carings aloft. This is effected by substituting
"only one reef on the foot of topsails, which is used in the
"double capacity of either single or close reef, as circumstances may require, and worked by means of reef sheets
"and tacks leading through cheek blocks on to the deck; the
"slack canvas is taken up by point bridles attached to
"each cloth leading through thimbles, and so on, to deck.
"The clews are of iron, with foot rope passing through a
"tube, and clew line shackles attached."

[Printed, 4d. No Drawings.]

A.D. 1854, June 19.—N° 1333.

BAUER, WILLIAM.—(*Provisional protection only.*)—"Propelling vessels."

The entire Specification runs as follows :—

"It consists in driving screws, paddle-wheels, or other
"propellers with which vessels may be fitted, with fans or
"rotating sails, such fans being connected with the shafts of
"the propellers by suitable mechanism. If the vessel is to
"be propelled by a screw, a portion of the keel is divided
"to allow that end of the shaft upon which the screw is fixed
"to be lowered, so as to work, if desired, at an angle of about
"10° with the level of the water. The dimensions of the
"sails constituting the wings of the fan can be reduced to
"any desirable extent, and the vessel is fitted with such

“ mechanisme as will, self-actingly, place the fans into the
 “ required position with the direction in which the vessel is
 “ moving forward.”

[Printed, 4d. No Drawings.]

A. D. 1854, June 20.—N° 1345.

STEPHEN, ALEXANDER, junior, and PIRNIE, ALEXANDER.—
 Templates for ship-building and other purposes.

This invention consists in the use or application for the construction of templates of “ open woven or closely perforated ” materials, such as wire cloth, hair cloth, or cloth of other suitable material, or of closely perforated flexible sheets of zinc, copper, or other metals or materials. These templates, which are to be fitted in a sliding frame, being laid upon the frames or plates of the structure, the positions of the rivet and bolt holes required are marked, and the markings are then transferred “ through the open texture or perforated holes,” to the plates or other materials in which the corresponding holes are to be made or punched.

For marking the positions of the rivet or bolt holes on the template, a small hair-brush may be used, the end of which, after being dipped in a mixture of whitening and water, is put upon the wire cloth of the template, exactly opposite or over each of the rivet and bolt holes, as seen through the template.

These templates may be used, among other purposes, in the construction of iron masts, spars, &c.

[Printed, 10d. Drawings.]

A. D. 1854, August 1.—N° 1691.

EVANS, THOMAS, the younger. — (*Provisional protection only.*)—Rigging ships.

The following is the whole Specification :—

“ The sail is to be suspended between any two masts of a
 “ ship or other vessel on a pole, rail, chain, or rope to be
 “ drawn from the head or any other part of the one mast to
 “ the head or any other part of the other mast. The said
 “ sail, being attached to a yard or separate, and being of any
 “ size or shape, is to be so suspended to such pole, rail,
 “ chain, or rope by means of a fixed or shifting block, pulley,
 “ *swivel*, or other such contrivance, affixed to the centre or

“ other part of the yard on which the said sail is to be set,
 “ or to the said sail when used without a yard, and swung,
 “ either running or fixed on such pole, rail, chain, or rope.
 “ The number and the position of the sails and masts may
 “ be limited or extended, and arranged according to the size,
 “ tonnage, shape, or other circumstance of the ship or other
 “ vessel to which they may be applied. The said improve-
 “ ments may be used either without regard to or together
 “ with masts and sails, on principles already known and
 “ applied in navigation. The end and object are, that a fore-
 “ and-aft rigged vessel may be changed to a square rigged
 “ vessel, and vice versa at the option of the navigator.”

[Printed, 4d. No Drawings.]

A.D. 1854, September 13.—N° 1993.

BETTELEY, JOSEPH. — (*Provisional protection only.*)—

“ Giving elasticity to ships’ standing rigging.”

The whole Specification is as follows :—

“ The object of my invention is to give elasticity to
 “ wire ropes and other ships’ standing rigging, in order to
 “ prevent the evil effects of sudden shocks, and consists in
 “ attaching an india-rubber or other spring on to the lower
 “ end of the rope, and fastening it to the ship’s side, in place
 “ of the present rope lanyards.”

[Printed, 4d. No Drawings.]

A.D. 1854, September 28.—N° 2084.

NEWTON, ALFRED VINCENT. — (*A communication.*)—“ Rig-
 “ ging of sailing vessels.”

“ This invention relates to the application of an extra yard
 “ to any topsail, which yard is supported upon the cap of the
 “ lower mast-head by a truss and crane, so that the upper
 “ topsail yard may be lowered down in close proximity to
 “ the said extra yard. By this improvement the topsail is
 “ divided into two parts, and may be reefed or taken in by
 “ one-third the number of men required to secure the same
 “ result according to the old plan. By the old plan, the
 “ yards are supported by a chain attached to the topmast
 “ above such yard. The upper topsail yard, therefore, can-
 “ not be lowered below the point of attachment of such chain

“to the topmast,” “but by the present improvement, the upper yard may be lowered down to the new yard, and the upper half of the topsail drops behind the lower half of the sail. After the upper half is taken in or furled, the lower half is closed in from the deck by the usual tackle and in the ordinary way.”

[Printed, 6d. Drawing.]

A.D. 1854, October 10.—N° 2171.

CHUBB, WILLIAM.—Beams, masts, spars, &c.

“The object of this invention is to combine iron and wood together.” “For this purpose, in constructing a beam” it is formed “in several parts of iron, which are imbedded in or clothed with wood on both sides. The plates of iron, which come vertical when in the beam, it is preferred should be curved on the upper and under edges, so as to form parts of an arch, and two of them curve by their inner ends into a key, or wedge-formed piece, which has a bolt through it, with a screw and nut at its lower end. These plates and the key-piece are let into or imbedded in wood on either side. Under these parts a bent plate is placed at right angles, which is also let into and imbedded in the wood. At the outer ends are formed shoes, through which screw bolts are passed, which pass through the wood on either side, and screw all parts tightly together. The plates of wood are further combined by other screw bolts passing through the same. In this manner may the timbers of ships be put together, and also the parts of ships’ masts and yards, and other structures of a like character requiring strength.”

[Printed, 6d. Drawing.]

A.D. 1854, November 16.—N° 2432.

HANN, WILLIAM.—“Propelling vessels.”

A propeller shaft is driven by a windmill on deck. A wind wheel is supported on a hollow upright, down the centre of which passes a shaft to communicate the motion to the propeller shaft. The wheel is composed of inclined vanes mounted on a horizontal spindle, and it is surrounded by a cylinder the windward side of which is bell-mouthed to concentrate the wind on

the wheel. The whole apparatus may be turned in any direction to catch the wind.

[Printed, 6d. Drawing.]

1855.

A.D. 1855, January 27.—N° 211.

FONTAINEMOREAU, PETER ARMAND le Comte de.—(*A communication.*)—"Machines for manufacturing thimbles " employed on board ship or elsewhere."

A mandril is mounted vertically on a table. Below the mandril on a pivot concentric with it is a lever arm capable of horizontal rotation about it. This lever is supported below on a wheel travelling upon the table. It carries on a vertical spindle on its upper side a roller which fits the mandril, so that when a piece of metal is held between the mandril and the roller, and the lever is revolved, the metal is formed into the shape required for the thimble. For holding the metal in position during the operation a lever is provided with a pin which fits into a socket in the table near the base of the mandril. Or a pair of pincers with a similar pin may be used. To remove the finished thimble the top half of the mandril can be detached.

[Printed, 8d. Drawings.]

A.D. 1855, February 2.—N° 249.

SOELMAN, WILLIAM. — (*Complete Specification, but no Letters Patent.*)—"Naukinetic or ship-moving machine."

The Specification describes a propeller to be driven either by hand-power or a windmill. The windmill is stated to be "of the same form as the propeller." This "is a disc of inclined planes attached to a horizontal shaft." "A line representing the height of each plane forms a right angle with the revolving axis, and a line representing the breadth forms an oblique angle with the plane of the same axis." The disc must be "exactly continuous" and for this purpose the

" lateral edges of each plane must coincide with, or be in the same planes as the lateral edges of the adjoining planes, and this result is attained by making all these edges radiate from one common centre. The planes are inclined at the angle of forty-five degrees." Three or more planes must be used. A set of dimensions for making a propeller is given.

The windmill is mounted on a frame which travels on castors on a ring on neck, so that it can be set to any wind. Motion is transmitted by an endless band passing round a drum on the propeller shaft and round another on the shaft of the wind-wheel.

[Printed, 8d. Drawing.]

A.D. 1855, February 17.—N° 362.

ROBB, JOHN, and HILL, LAURENCE.—"Masts and spars."

From the step to the upper deck the mast is of iron, the rest is of wood. The wooden part may be solid, or built up in any usual manner. The iron part is preferably tubular for the greater convenience of fixing in the wood. Masts of this sort are easily cut away.

Yards and spars are made of an iron tube for the central part and wooden spars securely fixed in for the ends.

[Printed, 4d. No Drawings.]

A.D. 1855, March 5.—N° 489.

LEWIS, JOHN.—"Rigging and sparring vessels."

" Along each side of the deck is a "spring beam" attached at two points to the ship. On each beam is constructed a frame. Each frame is formed of light and strong timbers, rising in a pyramidal form from the sides of the vessel, and connected at their tops by a cap or round top fitted to receive a very strong ball and socket joint which is attached to the main yard; said yard is made very strong by suitable horizontal braces to cross bars on the yard. And about midway between the centre and ends of said yard cross pieces are attached with spars or stretchers running both above and below, so as to carry two or more yards above and below the main yard; these are braced together in such a manner as to form a strong and light frame, that can be moved around on the ball and socket joint of the main yard, and between

“ these yards suitable sails are to be stretched, it being borne in mind to stretch sails on opposite sides of the centre so as to balance each other.

“ The forward end of the bottom yard is attached to a traveller on a semicircular way, and a centre block and fall confines the sail centrally below the ball joint when required, and when the vessel is ‘tacking,’ the sails will turn and assume their correct position by the after end swinging across the deck, while the forward end is retained by the traveller near the centre of the vessel, and the back end of the yard by a suitable tackle.”

[Printed, 8d. Drawings.]

A.D. 1855, March 15.—N° 588.

GRIGNON, GEORGE.—“ Detaching boats from ships’ sides.”

There is at the foot of each davit an additional block, “so that the ends of the ropes holding the boat may be carried through and meet at the centre in a block, pulley or other contrivance to be formed in the bulwark of the vessel, so as to be worked by one person only.”

“ Two ropes suspending from each davit a block,” are to be so arranged as to “run freely from the person who works the same at the bulwark of the vessel.”

A strong pliable rope is to pass from the block at one davit to that at the other, “so as to unite the two blocks or other contrivance by means of a rope, and to admit of the free running from end to end of the said rope of one, two or more blocks,” “which are to be swung thereon.”

On each of the blocks is to be fixed and suspended a “detaching hook,” which is to support the boat until lowered into the water.

This detaching hook consists of two bars connected in the middle by a rivet or hinge, so as to admit of their working thereon “in a similar manner to a pair of scissors.” At the lower end of each bar is a hook “pointing downwards.” On the hooked points of the bars being pressed towards and made to cross each other they “form a grasp for the ring, hook, staple, or other means of suspension contrived in and fixed to the boat for that purpose;” the arrangement being such that so long as the weight of the boat rests upon these hooks they are kept together, but on the boat reaching the water, and

its weight no longer acting on the hooks, they are caused to open by means of a spring placed between them, thus at once releasing the boat.

[Printed, 4d. No Drawings.]

A.D. 1855, April 2.—N° 733.

NEWALL, ROBERT STIRLING.—“Standing rigging.”

Wire rope for standing rigging is made of six (more or less) stout wires “laid or spirally bent round a core of flexible “material” preferably gutta percha, though other “flexible “waterproof composition” may be employed.

[Printed, 4d. No Drawings.]

A.D. 1855, May 3.—N° 991.

ROWETT, WILLIAM.—“Fitting, handing, and reefing vessels’ “sails.”

In square sails, the yard is grooved and the head of the sail is attached to a number of hooks which travel in the groove. These hooks are preferably fitted with antifriction rollers. In the centre of the yard is a “bunt bar” into which the hooks slide, so that the bar and sail can be lifted out and brought down on deck by a suitable tackle. From this bar a bunt rope extends vertically down the sail, and from each leach of the sail brails extend through thimbles on the sail to blocks on the bunt line and so to the deck. The foot is drawn in by bridles, so that the whole sail can thus be brailled up. For additional security, lines with running bowlines on them may be adapted to be passed round the sail when taken in. Travellers of other descriptions may be used instead of the hooks above mentioned.

The sail may be reefed by gathering it in by the brails, or by having additional bunt ropes and brailing in to them, or “by applying a reef tackle on the old plan the sail may be “reefed round the head-rope and by which the sail would be “ready to be gathered in to the bunt as before.”

With square top-sails, the top-sail yard is to be kept at the mast-head while the sail is being brailled up, after which it is lowered. The bridles at the foot may be dispensed with, and the foot of the sail may be fitted to travellers which run on a rope stretched from one yard-arm to the other. This sail may be reefed by the leach, or by the head, or “by the foot with

“ double reef pendants through bulls-eyes on the leach and centre (or bunt) rope.”

The top-gallant-sails are bent to the yard in the usual way. The clews are attached “ to a rotary eye on each lower yard arm, rotary motion being communicated to the eyes by pinions on the end of shafts extending from the slings to the yard arms and fitted at the slings with convenient gear to transmit motion by means of an endless band working over a friction pulley.” The endless band is worked from deck by a capstan or otherwise. “ By this arrangement any number of reefs can be taken in, cringles being fixed at each reef for passing a stopper.” “ To hand this sail, it is lowered by the ‘ lifts ’ and ‘ tye ’ down to the stay, being rolled up as it is lowered. Clews may be fitted to this sail so that it may be clewed up when required.”

In fore-and-aft sails, the mast, gaff and boom have each a rail of T-iron, on which clips attached to the sail slide. Or the clips may slide on the mast itself, which is shaped accordingly. The jaws of the gaff have antifricition rollers, to keep them away from the slide-bar.

Jibs and stay-sails may be taken in by reeving a down-haul from the tack to a block on the head of the sail and thence to a point on the after leach. A second down-haul is made fast at the clew and passes up the after leach to a block, thence down a row of thimbles on the sail parallel to the front leach, to a block on the bowsprit cap and thence to the deck.

[Printed, 8d. Drawing.]

A. D. 1855, May 21.—N° 1146.

MURTON, JOHN MAHON.—“ Sister-hooks and thimbles for ‘ ships ’ and boats ’ riggings.”

“ The main feature of novelty in the invention is, that the hooks are separated or opened broadwise only, in place of having a universal motion on their lower ends in the thimble, as in the ordinary ‘ sister-hooks.’ ”

“ According to one arrangement, the lower ends of the hooks are kept asunder by a small roller, which serves as a thimble round which a rope or block strap can be spliced. Through this roller and the ends or eyes of the hooks a strong pin or rivet is passed, which is rivetted on to washers, so as to allow the hook to open broadwise only.”

“Another arrangement consists in inserting an eye-piece between the lower ends of the hooks, an ordinary thimble being attached to such eye-piece in place of using the roller before mentioned. A pin is then passed through the lower ends of the hooks, and through a corresponding hole in the eye-piece, and tightened up by a small nut, having a washer of india-rubber or other suitable elastic material beneath it.” “This elastic washer and nut may be applied, if found desirable, to all the improved sister-hooks.”

“Another form consists of a somewhat similar arrangement to that herein-before last described, with the addition of a projecting tail, attached to or formed on the eye-piece, and projecting some distance inside the hook, so as to prevent the thimble to which the hook may be attached from ever coming below the points of the hooks.”

“Another arrangement consists in inserting a small block of metal between the lower ends of the hooks, such block having two holes drilled through it at right angles to each other and in different planes. One of these holes serve to pass the joint pin or pivot through, and the other or lower hole allows the hook to be attached to an iron strapped block.”

[Printed, 8d. Drawing.]

A.D. 1855, June 12.—N^o 1337.

ARMITAGE, WILLIAM.—“Union bags and sail cloth.”

According to the Provisional Specification “cotton warps and linen weft and linen warps and cotton weft” are employed. According to the Final Specification, a mixture of linen and cotton is used, and the warp and weft are varied as required.

[Printed, 4d. No Drawings.]

A.D. 1855, July 20.—N^o 1640.

CUNNINGHAM, HENRY DUNCAN PRESTON.—Reefing sails.

Improvements upon No. 13,368, A.D. 1850.

Instead of causing the yard to revolve as described in that Specification, a “double yard” is used, that is, two yards, one of which is mounted on bearings supported by the other so that it revolves, while the first remains stationary. The *revolving yard is actuated* in the manner described in the

former Specification, by a chain or band wound on a boss on its centre. Or there may be a cogged wheel thereon and the halliards may pass round a sheave attached to the fixed yard of which the axle revolves with it, and carries a toothed wheel engaging with the above toothed wheel. Any other means for revolving the yard may be used. Lower or standing yards may be revolved by a winch and suitable gearing.

In the former Specification a bonnet for covering the slit down the centre of the sail was described. The ropes along the edges of this slit may have the canvas folded over them and either sewn or cemented with suitably prepared india-rubber. The division of the sail may be narrower below than at top.

The blocks for the sail above are fixed to the "unrevolving yard," and have swivels so that they can adapt themselves to the direction of the sheet.

Fore-and-aft sails may be reefed in a similar manner, the boom being made to revolve by a winch or otherwise. The fore part of the sail is fitted with a bonnet like that adapted to square sails. The boom revolves on the collar about the mast and in a collar held by the main sheet. The jaws of the gaff are shaped so as to clear the edge of the bonnet.

[Printed, 10d. Drawing.]

A.D. 1855, July 30.—N° 1727.

FILLIER, JOSEPH MARIE.—"Looms for weaving."

An improved loom is described, capable of weaving sail-cloth eight or nine yards wide, instead of only two yards. By this means sails can be made of a single piece of canvas. To increase the strength, "bands of well-twisted thread" are woven in during the process of manufacture, both across and along the canvas, so as to form "squares of seven or eleven inches wide."

[Printed, 1s. Drawings.]

A.D. 1855, September 8.—N° 2034.

BOUCHERIE, HENRI. — (*Provisional protection only.*) — "Machinery for impregnating woods with chemical materials for their preservation and coloration."

The inventor constructs "an air-tight vessel or chamber of cylindrical, rectangular, or other form in which the logs or pieces of wood are placed in a vertical position. On the top of each log or piece is placed a plate of metal or other suitable material, with a ring or band of caoutchouc or other flexible substance to connect it with the wood." "There is a short tube in the centre of each plate, and these tubes are connected by flexible tubes to other short tubes passing through the sides of the chamber."

The vessel is filled with the preservative solution, which is intended to pass up the grain of the wood and out by the several tubes, attached to the plates. A vacuum is contrived to assist such passage, or the solution itself may be under pressure. The inventor mentions the use of this apparatus for preparing masts, &c.

[Printed, 4d. No Drawings.]

1856.

A.D. 1856, January 23.—N° 184.

NEWMAN, JAMES, and WHITTLE, WILLIAM.—(*Provisional protection only.*)—Masts.

The invention is principally intended for shafting, but it is also applicable for making masts, spars, &c. The inventors say;—

"Our improvements consist in manufacturing the articles above named in manner similar to that practised in carrying out an invention for 'Improvements in the manufacture of 'axles,' for which Her Majesty's Letters Patent, bearing date the 16th day of July, A.D. 1855, have been granted to us, by making them tubular, and strengthening them in the inside with a bar or bars running the whole length in a diametrical or radial direction in the cross section, so that when four bars or arms are employed which meet, and are welded in the centre, the transverse section shews the form of a cross within a circle. Should it be required to make the articles solid instead of tubular, or partly solid and partly tubular, rods of the requisite section and length are

“ inserted into the hollow spaces, and welded therein by rolling or otherwise.”

[Printed, 4d. No Drawings.]

A.D. 1856, January 29.—N° 243.

GLADSTONE, SAMUEL PALMER.—“Masts and yards.”

“The lower part of a mast is made hollow or tubular, of metal, and such lower part is fixed to the kelson by means of a flanch and bolts. The hollow or tubular part of the mast rises through the decks of a vessel in such manner as to come above all the decks but the upper deck, and into this tubular or lower part of a mast, a filling piece or pieces of wood or metal are introduced, on to which the lower end of the upper part of the mast, which is of wood, steps; and such lower end is received into and retained in position by the upper portion of the metal or tubular part of the mast. In constructing a yard, the middle portion is made of metal, and hollow, to receive and have fixed therein two ends of wood.” “In masts for steam ships [or vessels propelled by a screw or submerged propeller, a passage may be made through the tubular part of the mast for the passage of the shaft of the propeller.”

[Printed, 10d. Drawing.]

A.D. 1856, January 31.—N° 260.

NAPIER, GEORGE.—(*Provisional protection only.*)—“Apparatus for raising, lowering, & suspending boats from ships.”

This invention consists in supporting the davits “by means of two vertical screws sustained at the upper part by an arm or standard raised from the gunwale, & in which the screws are free to rotate. The screws rest and are stepped into two bearings at bottom, fixed in the side of the ship. The davits have each a long boss, with a female screw fitting the vertical screws, by turning which screws & at the same time preventing the davits moving round with them, the davits will be carried up or down on the screws. The screws have each a crank at the top, which cranks are placed in connection with a connecting rod, so that when turned round they may perform the same number of revolutions. The boat is

“suspended from the davits in the ordinary position, but slung by means of claws or hooks, which open in the manner of a pair of smiths tongs, the long ends or arms of which clasp the gunwale, the whole being hung from the short ends by a short chain or rope, the tension of which keeps the claws of the long arms together, so that on the boat alighting on the water they release their hold when the boat is free.” “To lift the boat the claws are held in position to grasp the gunwale, & both the vertical screws caused to revolve by clapping hands on to the connecting rod, causing both to rotate simultaneously & in unison with the revolutions of each other.”

[Printed, 4d. No Drawings.]

A.D. 1856, February 14.—N° 379.

PARKHURST, STEPHEN ROSSIN.—“Sails and rigging.”

“A ring or circular frame of wrought-iron pipe, or similar material,” has fitted sails within it “in segments of a quarter, or other portion of the circle, which sails are attached near the centre of the ring, and provided with rings over the circular frame, before mentioned, and the two straight sides of each segmental sail are attached respectively to one of the arms connected to the circular frame before mentioned, and to a stretcher on the other side, so that on giving said stretcher a quarter circle motion, or motion equal to the length of the sail at the circular frame, the said sail is either spread to the wind or furled away in a manner similar to shutting a fan, and a rope attached to the inner corner of said quarter circle or said segmental sails serves to tighten the same when stretched. The circular sail, thus constructed, is mounted on a horizontal ring or circular way, and sustained by metallic pipes or other supports to the centre of the sail, so that each sail can be turned round into any desired position relatively with the vessel to take the wind correctly.” “A range of these circular sails” is mounted “on each side of the vessel at or near the bulwarks, and also a range centrally of the vessel sufficiently above the side sails to swing clear of the same.” Each frame is mounted on a circular plate fitted in a bed so that it and the whole frame can be rotated by means of gearing,

[Printed, 10d. Drawing,]

A.D. 1856, February 14.—N° 388.

COWPER, CHARLES. — (*A communication from Henri Boucherie.*)—"Improvements in impregnating wood with " preservative and colouring materials, and in apparatus for " that purpose."

The patentee constructs "an air-tight vessel or chamber of " cylindrical, rectangular, or other form in which the logs or " pieces of wood are placed in a vertical position. On the " top of each log or piece is placed a plate of metal or other " suitable material, with a ring or band of caoutchouc or other " flexible substance to connect it with the wood." "There " is a short tube in the centre of each plate, and these tubes " are connected by flexible tubes to other short tubes passing " through the sides of the chamber."

The vessel is filled with a preservative solution, which is intended to pass up the grain of the wood and out of the several tubes, attached to the plates. A vacuum is contrived to assist such passage, or the solution itself may be under pressure.

The inventor mentions the use of his apparatus for preparing masts, &c.

[Printed, 8d. Drawing.]

A.D. 1856, April 30.—N° 1023.

DYER, SAMUEL.—"Reefing, furling and setting the sails of " ships and vessels."

In square sails, the head of the sail is affixed to a roller which revolves in bearings below the yard. At each end of this roller is a drum or pulley. "Reefing chains" are led through blocks on the mast-head to blocks near the tie block on the yard, thence one on each side along the yard through sheaves at its end over the drum on the roller, back along the yard and down to the deck. When the yard is lowered these chains revolve the roller and wind the sail on it, or when the yard is fixed, the same effect may be produced by hauling on the chains.

A "fixed coat of painted canvass," &c. is attached to the yard to form a cover for the sail when furled.

Flat ropes may be used for the leaches of the sails. An iron jackstay rod is attached to the "rolling jackstay," or the sail

may be bent directly on to the roller. Friction rollers are fixed to support the roller in the middle.

"To prevent the sail flying to leeward whilst being furled "or reefed," a guide is attached to each clew by seizing on the leach of the sail a thimble "through which a rope is rove "up and down, one end being fastened to the lower yard to "an eye made in the pin of the topsail-sheet sheeve, and the "other taken upwards through a cleat, having a sheeve on the "hounds of the topsail yard; it is then carried on along the "yard to the sling, and rove through a small block" "fastened to the yard near the sling band, then up to the cross "tree where it is made fast, and thus represents an endless "rope, and the yard on ascending or descending passes and "repasses over it without detriment."

The rolling jackstay may also be suspended in the middle, and the sail be divided down its centre. On each side of this opening is a double leach. "Between these two leaches" is a strip of canvas which slides up and down and "is kept in place "by six or more 'four-holed guides.'" "The lower end of "this 'apron' is attached to a roller fixed in an iron frame "in the foot of the sail, which is made to revolve by means of "a rope or chain attached to the yard."

In fore-and-aft sails a corresponding arrangement is made except that the roller is fixed above the boom. Suitable alterations are also made in reefing gear. There is an "apron" which is laced along the after leach of the sail by hand. The roller is supported at suitable points within jaws furnished within with rollers.

[Printed, 1s. Drawing.]

A.D. 1856, May 6.—N^o 1063.

WRIGHT, JOHN.—"Lowering ships' boats."

"The boat is secured by having a chain passed round it on "each side just below the gunwale, and this chain is made "fast at each end of the boat to the davits. Other chains are "attached to the first chain in two or more places, there pass "under the boat, coming up on each side, and the whole "forms a kind of frame or cradle, in which the boat hangs "securely. The davits (which should be wider apart than "the length of the boat that it may swing clear between them) "are attached to the side of the vessel by joints, at the lower

“ end of each, at short distances above the average load water line, to allow the davits to be lowered outwards from the side, so that the ends to which the chain, slings, or frame, above named, are attached, may descend below the surface of the water, their descent being regulated by a chain or rope fastened to them, and rove through sheeves or blocks on the bulwarks of the vessel, and then wound in contrary directions round a revolving barrel or drum, in such manner that the davits may be lowered or raised simultaneously. On to the axis of this barrel or drum is fixed a wheel of much larger diameter than the drum and so formed that round it a rope may be wound, so that when the davits are being lowered the rope winds on to this larger wheel, and according to the speed at which it is suffered to run out, it regulates or stops the descent of the davits, or if hauled upon it hoists them up. As the davits descend they carry with them the boat resting in the frame or slings, as before described, and project it beyond the side of the vessel, and as the davits continue to descend below the surface of the water the boat floats clear of them and of the frame or slings.”

[Printed, 6d. Drawing.]

A.D. 1856, May 6.—N^o 1065.

NEWTON, WILLIAM EDWARD. — (*A communication.*)—

“ Connecting boats with their tackle, and clearing or detaching them therefrom when lowered.”

This invention consists substantially in the use of a hook or other instrument, so contrived that on the boat taking the water the tackle will become detached, “and swing clear of its attachment.”

One mode of effecting this consists in connecting to each end of the boat a forked piece of metal, the forked part projecting upwards. Each of these forks has one of its prongs straight, there being placed loosely thereon a kind of collar, capable of moving up and down thereon, but prevented from wholly leaving the prong by a pin. The other prong is formed with a wedge-like projection, and the block of the tackle is furnished with a piece of metal, the lower end of which has also a similar projection, these parts being so contrived, that on the lower part of this piece of metal being inserted between

the prongs of the fork, and the collar moved upwards, a connection between the boat and tackle is formed, which will be retained so long as the weight of the boat rests thereon. On the boat taking the water, however, the collar slips downwards and releases the piece of metal.

Another mode of effecting the same object consists in employing, instead of the ordinary hook, a bolt with a conical head, this head being passed through a hole in an iron plate fastened to the boat, and grasped by iron jaws arranged below the plate. These jaws are furnished with springs, which, on the boat taking the water, cause them to open and release the boat, the weight of the boat preventing this effect while the boat is sustained by the bolt. In case of the springs not acting, lanyards may be added to draw the jaws apart.

[Printed, 8d. Drawing.]

A.D. 1856, June 7.—N° 1360.

DYER, SAMUEL.—Sails.

“This invention consists in the adoption of a hollow or tubular yard, with an opening to allow the sail to pass into the hollow thereof, such yard being provided with a roller running through the same from end to end, upon which roller the sail is wound by the aid of pulleys or wheels belonging to the said roller, and the tackling in connection therewith (which may communicate with and be worked on deck), and from which roller the same may be unwound by the same agency. By this means the whole of the sail may be enclosed in the hollow yard, and preserved from injury from wet, &c.”

In fore-and-aft sails, the boom is to be hollow, and constructed as above described. Jaws of the usual sort are used.

The yard, &c., may be made of galvanised sheet iron.

Reference is made to No. 1023, A.D. 1856.

[Printed, 8d. Drawing.]

A.D. 1856, June 18.—N° 1438.

CLIFFORD, CHARLES. — “Improvements in boat lashings and in blocks and apparatus used for raising and lowering boats.”

The object of the first part of this invention is “to obviate the necessity of unlashings the boat before lowering it.”

The davits are furnished with prongs pointing downwards, and the lashings are furnished with loops, which are passed over those prongs, the lashings being drawn tight by lacings. When the boat is lowered these loops slide downwards and off the prongs, thus releasing the lashings therefrom.

The second part of the invention consists in "a method of arranging friction blocks with three sheaves or pulleys, so that the position of the sheaves of pulleys may be changed and adjusted, so as to increase or diminish the friction, as may be required." This is effected by so arranging the bearings of one or more of the pulleys that the relative positions of the pulleys may be changed at pleasure, the bearings of the moveable pulleys being acted upon by screws or otherwise.

The third part of the invention relates to arranging the apparatus for lowering a boat, so that the lowering may be regulated by a person in the boat, and the boat be t free when it enters the water. The suspending ropes are passed through blocks connected to a davit, then carried down and passed through blocks in the boat, and then coiled upon a barrel fixed at the bottom of the boat, and of similar character to that described in the Specification of a former Patent [No. 895, A.D. 1853?] granted to the present patentee, this barrel having also connected to it a third rope, by which the descent of the boat may be regulated. Each block has below it a hook, and the boat is suspended therefrom by a link, at the lower end of which is jointed a forked piece of metal, the lower end of the latter again being furnished with a short chain, into one of the links of which a catch enters, and is retained there until the boat reaches the water by a lever so contrived as to be moved and release the catch by the action of a cord connected to the ship, the length of which is adapted to the distance through which the boat has to be lowered.

[Printed, 10*d*. Drawing.]

A.D. 1856, August 9.—N^o 1880.

MARCH, CHAPMAN. — "Propelling and working ships and vessels."

A "horizontal wind wheel" is fitted on the ship's deck and imparts motion to a propeller. "The wheel is large enough

“to overhang the deck on each side.” It is fitted with inclined vanes like those of a paddle-wheel, and each of these may be connected by a rod and crank to an excentric on the main axle, so that the vanes on one side are “feathered” and the wheel in consequence rotated by the action of the wind on one side only. Or a “shifting cover” may be used to screen one portion from the wind. The wheel may serve for hoisting the sails, &c. A revolving light may be fitted on the top of the wheel to form a signal.

[Printed, 6d. Drawing.]

A.D. 1856, August 19.—N° 1939.

BROUARD, JOSEPH, and HUBERT, JOSEPH.—“Reefing the sails of ships and vessels.”

The inventors use an additional yard upon which the sail is wound. To support this a boom iron with three hoops is used, of which one fits over the yard, a second supports the roller, and a third holds a boom which extends along the sail to protect it from rubbing against the shrouds.

The roller is further supported by a hoop at the end of a lever pivotted on the truss which supports the mast. This hook may be held against the roller by a line on the long arm of the lever. Rollers may be fitted within this hook. Instead of this hook and lever, a clamp with a hinged jaw may be used. For reefing and furling the top-sails, lifts are wound on collars on the ends of the roller, and thence pass through blocks at the mast-head and to the deck. When the halliards are let go, and the yard falls, the lines are unwound from the roller and roll the sail upon it. A similar arrangement is made for the lower sails, except that the lifts are hauled upon instead of the yard falling.

[Printed, 1s. 8d. Drawings.]

A.D. 1856, September 10.—N° 2109.

CUNNINGHAM, HENRY DUNCAN PRESTON.—(*Provisional protection only*).—Reefing sails.

Improvements on N° 13,368, A.D. 1850, and N° 1640, A.D. 1855.

These consist “in producing the rotary motion by passing the bands or ropes round the extremities of the revolving yards, to which they are conducted by suitable sheaves or

“pullies. At each end of the revolving yard are fixed whelped bosses.” “The centre of the revolving yard is supported by a saddle fixed to the standing yard. This saddle may be made of wood, metal, or other suitable material, and may be fitted with friction rollers, or not, as desired. The sail is attached to the revolving yard by the jackstays and earrings in the ordinary manner, or by any other desirable method. The chains for effecting the rotation are fixed aloft by haultards, and led through a system of pullies over the whelped bosses and through pullies on the other side of the fixed yards. In lower yards, which do not lower up and down, the rotation is produced by leading the ends of the chain on deck, and hauling on them by tackles.”

[Printed, 4s. No Drawings.]

A.D. 1856; September 19.—N° 2203.

FINCH, EDWARD.—Wrought-iron masts, bowsprits, yards, &c. and rigging.

The masts, &c. are “multilateral in shape instead of cylindrical” and formed of a number of plates each of the proper shape to make one side. These are rivetted to angle irons of length equal to that of the mast, &c. required. The rivet holes are made taper, by means of a punching machine in which the hole in the bed die is larger than the punch. The smaller ends of the holes are placed in contact, “a headless rivet is introduced from the outside of the tube into the holes, and it is clenched in the usual way.”

Pieces of wood may be inserted into the masts, &c., such pieces having been first compressed so that they may expand and fit tight. These insertions are specially to be made “where attachments or holes have to be made” or sheaves let in. The compression is effected by means of a hydraulic press which drives the beam of wood forcibly through a taper hole of the size required.

For setting up the shrouds, metal checks are fixed on the mast-head, one pair on each side of the mast. Through each pair a pin passes and on each shroud an eye is made, so that they may all be strung on the pin and thereby attached to the mast.

[Printed, 1s. Drawings.]

A.D. 1856, October 21.—N^o 2477.

NEWTON, ALFRED VINCENT. — (*A communication.*) —

“Reefing, furling, and unfurling of sails.”

“This improvement is effected by providing an adjustable folding yard, formed of two rods or bars sufficiently long to span the sail, and fitting at its ends into spools carried by bearing plates, these bearing plates are suspended from ropes, which pass up to the top yard, thence over pulleys in the trestle-tree and down to the deck. A rope is coiled round each spool at the opposite ends of the folding or reefing yard in the same direction, for the purpose of revolving the reefing yard and rolling up the topsail which passes between the bars of this double yard. These ropes are attached to the spools, and coiled around them a sufficient number of times to insure the requisite number of revolutions of the reefing yard; they then pass upward and through the topsail yard, at or near the ends, and from thence they pass through a moveable pulley and down to the topsail yard, to which they are made fast. This moveable pulley is supported by a rope, which passes to a pulley in the trestle-tree, and from thence to the deck. The halyards are applied in the usual manner, being connected and passing through the topmast, and thence to the deck. On lowering the topsail yard and sail, a tension and drawing is produced upon the reefing lines, whereby the spools and folding yard are revolved. Thus, as much of the sail is wound up in two directions as may be required for reefing, or the sail may be in this manner be completely furled. Half the number of revolutions of the reefing yard required to furl or reef a sail where one yard only is used at the top end of the sail will suffice when the sail is thus arranged and operated. If the slackening of the halyards is not sufficient to allow the topsail yard and the sail to descend, it can be accomplished by applying power to the down haul line. When the whole sail is required to be furled, it can be performed by liberating the sail at the lower corners and by pulling on the rope which carries the moveable pulley.”

[Printed 8d. Drawing.]

A.D. 1856, October 31.—N^o 2556.

FERGUSON, CHARLES AUGUSTUS.—(*Letters Patent void for want of Final Specification.*)—Preparing timber for mast-making, &c.

The following is the entire Specification :—

“ These improvements consist in preparing timber for ship building, mast making, and other purposes, by charring the inner surfaces for the prevention of mildew and rot ; for which purpose, after the timber is cut out, I take a large iron roller, and having made it hot, I roll it over the surfaces of the timber, which are to be placed in contact with each other, until they are sufficiently charred, after which they may be put together and united in the usual manner. In treating planks for ship building, two rollers may advantageously be employed, the lower one being fixed and the upper one moveable for convenience of heating ; when the upper roller is heated and placed above the lower one, the planks are passed between them, the inside of the plank being placed in contact with the heated roller.”

[Printed, 4d. No Drawings.]

A.D. 1856, November 1.—N^o 2565.

SMITH, PETER, and IRVINE, THOMAS.—(*Provisional protection only.*)—“Masts, yards, and rigging.”

The entire Specification is as follows :—

“ Instead of the usual method of arranging the topsail yards, we by this invention fix permanently and securely the first or lower topsail yards to the lower mast heads, by means of iron bands, chains, or in any convenient manner, and connect them to the lower caps entirely independent of and in no way attached to the topmasts ; we also reverse the caps on the lower mast heads, and place the topmasts on the ‘after’ side of the lower masts, instead of the ‘forward’ side, as hitherto adopted ; thus a ship, in the event of the topmasts being carried away, would still be under close-reefed topsails, courses, and staysails, a great advantage to a vessel when so disabled, and altogether impossible by the present arrangement of masts and yards.”

[Printed, 4d. No Drawings.]

A.D. 1856, November 20.—N° 2750.

BENSON, ROBERT BROCK.—"Reefing sails."

The invention "has for its object the reefing and letting out the reefs of sails from the deck, and consists in fitting across the sails as many foot ropes as there are required to be reefs, and in securing thimbles or eyes at intervals across the sail." To the bottom of the sail bunt-lines are attached which are carried "through the thimbles up through blocks or sheaves, one on each side of the mast; these buntlines are secured to one rope or line on each side of the mast, and carried down to the deck. Each end of each foot rope has a reef sheet carried through a block on the end of the yard just below it, and these sheets are also carried down to the deck. In order to take in a reef the yard is lowered, and the reef buntlines hauled down, when the reef will be taken up, the end reef sheets secured to the foot lines are hauled down, whereby the ends of the reef are held secure down to the yard of the sail immediately below it. To let out the reef the buntlines and reef sheets are let go, and the yard hoisted up." In reefing the lower square sails, the reef is taken in at the head of the sail, and the bunt-lines are carried through sheaves above the yard, and down on the deck. In order to take in the reef, the tack and sheets are slackened, and the reef bunt-lines hauled down, when the reef will be taken in at the upper part of the sail, the tack and sheets must then be made taut. To let out the reef, let go the buntlines and haul down the tack and sheets."

[Printed, &c. Drawing.]

A.D. 1856, November 27.—N° 2809.

GILBEE, WILLIAM ARMAND.—(*A communication from Isaac Boss.*)—(*Provisional protection only.*)—Reefing and reducing topsails.

These are "four eyelet holes in the reef, the first two being about two feet from the centre of the sail on either side, the outer holes being about four feet from the centre. The lines reef from aft forward, having knots in the ends of the lines, bringing the knots close to the holes; the lines then run up between the head of the sail on a straight line and the fore part of the yard, thence to the mast head direct,

“ with a block at the mast head, reefing from forward aft, and
“ thence bending on deck, or in the top, so continue with as
“ many lines as may be deemed necessary, according to the
“ size of the topsail. These lines should be made fast accord-
“ ing to the lifts of the yards, that is, when the yard is down
“ the close reef will be in its place. For reefing the second
“ and first reef, slack the lines of the close reef, giving the
“ second and first reef an opportunity to come to the yard.”

[Printed, 4*l*. No Drawings.]

A.D. 1856, November 29.—N^o 2829.

BROWN, JOHN.—“ Lower masts.”

“ The top of the mast from the ‘cap’ to the ‘truss hoop’ ”
is made “ in the form of a tube, of wrought iron, similar to
“ an ordinary iron mast; from thence the metal is continued
“ downwards in the form of four taper arms or strips of metal
“ of equal width; each of such said strips being one-fourth
“ of the circumference of the tube from whence such said
“ strips of metal commence, and form part of such said tube;
“ said strips are formed of equal length to the tube, and
“ terminate each in a point at the bottom. The other and
“ lower part of the mast is entirely of wood, and the upper
“ part thereof is fitted into the aforesaid tube as far as the
“ hounds where it abuts against a strong iron cross plate
“ formed in such said tube. The above-mentioned taper
“ arms fit closely to the wooden portion of the mast, to which
“ they are securely fixed by strong iron hoops, or other con-
“ venient means.”

[Printed, 6*d*. Drawing.]

A.D. 1856, December 8.—N^o 2905.

EATON, RICHARD.—Springs.

Various sorts of springs composed of india-rubber are described, some of which may be used for standing rigging. These consist of a bolt with a plate at the end bearing on a spring composed of sections of india-rubber alternating with metal plates. The other end of the spring is supported by a similar plate through which the bolt passes. The india-rubber is vulcanised, and it is stated that the novelty consists in dividing the india-rubber into thinner pieces than usual.

[Printed, 10*d*. Drawing.]

A.D. 1854, December 16.—N° 3002.

Best's Patent.—Simple yards.

The inventor combines wood and iron together to form the yard. The following description is given of the method of construction.

"I take a spar of about three-fourth parts of the length which the yard is required to be, and the other fourth part I take of two wrought-iron tubes respectively fixed on each end of said spar for about two feet, said tubes are closed at both outer extremities, and the tackle is connected thereto in any convenient manner. The metal of which the abovesaid tubes are made is continued from said tubes in two large strips or strips of equal size, extending about six feet along the wooden spar and terminating in points. These strips of metal are securely fixed to the spar by wrought-iron bands of suitable number and strength. In the event of the wooden portion of the yard becoming broken, the abovesaid metal tubes may be removed therefrom and attached to another spar, thereby utilizing the metal portions of the broken yard."

[Refer. to Drawing.]

A.D. 1856, December 26.—N° 3074.

BAIRD, WILLIAM.—(A communication.)—"Air and water-proof coatings."

Among other processes the inventor describes one by which fabrics and other matters may be preserved from decay. They are treated by immersion in, or sprinkling with, "a gelatinous solution," "and after desiccation with a solution of tannin." The gelatine "consists of glue, bone gelatine, dust, glutinous matter, &c., &c., according to the nature of the fabrics. The tannin is made of all tanning substances, pure tannin, decoction of nutgall, of sumach, of boblah, and also of oak bark."

"The process is particularly applicable to cordage and sails of ships." It may also be applied to the "wood of ships."

[Printed, &c. No Drawings.]

1857.

A.D. 1857, January 6.—N° 53.

DUNBAR, ALEXANDER ARTHUR. — (*Provisional protection only.*)—"Lifting, lowering, and disengaging ships' boats."

"In these arrangements the outer ends of the two davits on the ship's deck or bulwark are connected together by a longitudinal rod or link piece, jointed at each end to the davits, and this rod has suspended from it near one end a snatch block, with an open or hinged side for the free entry therein of the tackle or fall as required. Each davit also carries at its outer end a complete purchased tackle, the upper block in each case being attached to the davit by a swivel link, whilst the lower blocks each have a bottom connecting hook. The fall from one tackle passes direct to the part where the haulage is to be applied, whilst the fall from the other is brought along beneath the connecting rod of the davits, and then passes over the snatch block suspended from that rod, thus bringing both falls finally together for working in exact concert." "The disengagement is effected by a detent contrivance at each end of the boat, the two detent actions being connected by a longitudinal rod passing along the boat's bottom."

"In this way, when the disengagement is to take place, the sailor by moving a catch lever can act upon both connections, and cause a simultaneous disengagement of both ends of the boat."

"Belaying pins are provided upon one of the lower blocks for the attachment of the falls."

[Printed, 4d. No Drawings.]

A.D. 1857, January 10.—N° 89.

HODGSON, JAMES.—"Wrought-iron masts, yards, bowsprits, and other ships' spars."

The sheets of which the masts, &c. are composed are bent to their proper shape, and their edges are turned up, so that they may be rivetted together on the outside. The flanges thus formed make a longitudinal rib along the spar. "Care must be taken to break joint between the plates in the vertical direction."

[Printed, 6d. Drawing.]

A.D. 1857, January 21.—N° 179.

DYER, SAMUEL.—“Ships’ fittings.”

Mast hoops are made as follows :—The hoop is made in two pieces hinged together. The ends of the opening jaws are formed into cheeks which can be held together by a binding screw. These cheeks are hollowed out so as to form two holes when closed. Through one of these the leach rope passes, and through the other a guide rope with stops on it which keep the hoops the same distance apart. The sail itself is held between the two cheeks. This hoop is intended to be used principally with the rolling jackstay described in the Specification of the Patent, N° 1023, A.D. 1856, by the same inventor; and a rest may be fixed on the mast to receive the hoops as the sail is taken in, and keep them off the winding gear of the jackstay. The jackstay may “pass through a distinct try-mast mast having an iron shoe, which steps in the boom or on the deck,” and the end of the jackstay “nearest the mast is provided with its proper toothed wheels for communicating motion thereto.” Palls are fitted to these wheels. A worm and toothed wheel may be used to revolve the jackstay. This worm “may be placed above the roller or between the rolling jackstay and the boom, and may have a pall,” &c., or the boom “deprived of the rolling jackstay may be made to rest in a stanchion of wood or iron.” “The worm also” may “rotate the lower or main boom, to do which it is necessary that the topping lifts and mainsheet blocks should be hooked on to a loose band at the extreme end of the boom,” or the “same mitre wheels may be fixed to the main boom and made to rotate as before.” Or “a lever similar to that used for windlasses” may be employed.

To “support the mast” rope is used “of hemp or wire, having at the lower end an iron shoe (tulip-formed) which is fastened to the end of the rope or shroud with bolts or pins of iron rivetted through.” This shoe has a screw by which the shroud may be tightened. It is fastened to the ship’s side by bolts.

A jib hank is made on the same principle as the mast hoop, except that there are three holes of equal size. The first hole is for the eyelet hole in the fore-leach which is held fast by the screw passing across and connecting the two parts. The second is for a guide rope like that used with the mainsail. The third

is for the stay. It is slit so that it can be slipped over the thin flat plate at the end of the stay, but holds fast the round part of the stay. "When the sail is hauled down a pin is placed through the plate and pin for that purpose which secures the stay to the jibstay band, such plate having a shackle to prevent the hank from passing off the rounded part of the stay, which pin, if removed, will allow all the hanks to slip off the plate, and the tack of the sail being seized, or lashed, or hooked to the travellers, follows it on the boom, when its outhaul is slackened until it reaches the standing boom end." A spring hook is preferred to be used with this arrangement. The down-haul is then slacked and the jib swings in.

The jib traveller is a large ring "with a neck composed of other smaller rings."

Instead of mast hoops, a hank may be used with claws which slide on a bar of T iron affixed to the mast, or with a solid stud which slides in a slotted tube.

Instead of the "suspension claw" described in N° 1023, A.D. 1856, a support for the boom may be used, which "is a perfect circle having rollers all round, which is passed on the boom or rolling jackstay, and at top is a T piece of iron, having ears open, to which is attached a quarter width of canvas on end double, and at intervals of 18 inches are similar loose irons, which nip the rope on each side of the opening of the sail, and rise and fall according as the sail is hoisted or lowered, and the suspender may have a band for securing the same to the boom."

[Printed, &c. Drawing.]

A.D. 1857, February 19.—N° 492.

CATO, PETER, and BETTELEY, JOSEPH.—(*Letters Patent void for want of Final Specification.*)—"Masts, yards, and spars."

The inventors say:—

"The yards are formed of a tubular or other shape of iron, having flanges or projections on their outsides, and between or beside such flanges we place iron of an increased width to strengthen the centre portion of the yards, and between or beside such flanges we attach bulb, tee, or other sectional shapes of iron to give increased strength to the yards. We

“ also form yards of iron plates kept apart by means of bolts or
“ other filling pieces, and at the ends of such yards we also
“ apply wood or iron pieces also kept apart, and fastened by
“ means of wedges or bolts, so as to secure these parts into
“ the main body of the yards. Between the two plates of this
“ last description of yard we place a centre plate, which we
“ call a fish-back, to strengthen it in its centre. We also
“ apply a similar piece of iron to increase the width of an
“ ordinary shaped tubular yard, or of one formed as we have
“ first described, for the purpose of strengthening the yards
“ from the outside. We also apply plates of iron between
“ the flanches and passing through the yard for giving
“ increased strength. This plan is also applicable to wooden
“ yards or spars for a centre piece, the wood being applied
“ instead of the tubular portions of iron, as above described.
“ We also form masts, spars, and yards of iron of a tubular
“ form (either with or without the flanges or fish-backs, as
“ above described), having their extreme ends made of wood,
“ so as to form the mastheads and yard arms. We also form
“ masts of a tubular shape, having flanges on the outside, as
“ described in the making of the yards, and also with the
“ application of plates of bulb or other sectional shapes of
“ iron, or of fish-back pieces of iron placed between or beside
“ the flanges, or otherwise attached to the masts on the outside
“ for giving increased strength. We also form tubes of a
“ short length with flanges, or what we call fish-backs, for
“ strengthening them, for the purpose of securing two spars
“ at the butt ends to form yards.”

[Printed, 4d. No Drawings.]

A.D. 1857, February 23.—N° 525.

LA CROIX, FRANCIS CONILLIANE. — “Reducing and reefing
“ the topsails of vessels.”

The sail is of the usual construction with reef points and thimbles in the leach for reef tackles. To the lowest of these a tackle is permanently affixed, and at points along the bunt-line similar tackles are attached, the ropes from which pass through sheaves in the yard and over pulleys on the cross-trees to the deck. When the yard is allowed to fall, the lower part of the sail is kept stretched by these tackles, and the upper *part falls behind* the lower part, thus reefing the sail. If a

smaller reef is required, the reef points are used, but as the lower half of the sail is always kept full, the operation of reefing is stated to be facilitated by the fact that only a small part of the sail has to be lifted instead of the whole.

[Printed, 10d. Drawings.]

A.D. 1857, February 25.—N° 559.

GODET, AUGUSTE.—“Reefing sails.”

“The sails have attached across them at intervals strengthening bands or cords, to which are fixed ropes which pass up to the yard, and from thence through blocks or rings to the mast, and are there hooked on to another rope or ropes which pass through blocks to the deck. When it is required to reef the sail, these ropes are pulled upon until the first strengthening band on the sail comes up to the yard, and it is held there by means of fastening apparatus (one of which is attached to each of the ropes fixed on the first strengthening band) which pass through rings fixed to the yard. This fastening apparatus consists of a forked piece of metal, termed a ‘flying fish,’ having wings or projections which turn on pins passed through the forks. The inside ends of these wings or projections are formed with teeth, which take into each other, so that when either of the wings or projections is caused to project outwards in consequence of its outer end meeting the edge of the ring, the other wing or projection is made to project outwards at the same time, so that when the apparatus has passed through a ring it is prevented from being drawn back through it, and in consequence it prevents the return of the rope to which it is attached. When it is required to take in another reef, the ropes attached to the first strengthening band are unhooked from the rope or ropes, which pass to the deck, and by continuing to pull on these latter ropes another reef is taken in, in the same way as before.

“In order to lower the sails when a reef has been taken in, a man is sent out on to the yards to close up the wings, and thus send the ‘flying fish’ back through the ring.”

[Printed, 10d. Drawing.]

A.D. 1857, February 28.—N° 596.

CUNNINGHAM, HENRY DUNCAN PRESTON.—Reefing and furling sails, &c.

A "strip of cord matting or other like strong material" is affixed to sails to strengthen them where required. Toggles of wood, &c. may be attached to the sail whenever it is subject to strain.

The *note* of the Specification refers to improvements on *previous patents*, especially No. 13,365, A.D. 1850. In these *previous specifications* methods were described of reefing a sail by means of a revolving yard or a rolling jacksay attached to a fixed yard. For supporting such a revolving yard at the mast, a band or rope is attached thereto which is wound on a wheel with the sail. This band is led over a block on the fixed yard or on the mast, to a tackle worked from the deck. Above the rolling yard is a rest, against which it may be held by hauling on the tackle.

Additional means for securing the rolling yard may also be used. A curved lever may be pivotted to the fixed yard. It is of such shape as to fit close round the rolling yard, and pass through an eyelet hole in the sail. A rope is then passed through an eye in the end of the lever and the rolling yard prevented from turning. The lever may be raised and disengaged from the yard by means of a line connected therewith.

Or a ratchet wheel and pall may be affixed at the end of the rolling yard to prevent it from turning. The pall is disengaged by a line affixed to it.

The irons in which the rolling yard has its bearings may be formed as crutches which receive spindles on the ends of the yard and have across them pieces to secure it. The ring also which carries these irons may revolve on the fixed yard, so that the rolling yard can be brought into any position in reference therewith.

A similar method of reefing may be applied to studding sails, on the yard-arms of which the reefing lines are coiled. These are then either made fast to the top-gallant studding sail booms above, or led through blocks therein to the deck.

The hooks or claws used to support rolling yards may be lined within with any soft substance, or the rollers therein may be formed of, or coated with, any substance like india-rubber, soft enough not to injure the sail.

Bosses are fixed on the rolling yard to receive the reefing lines.

Battens are fixed on the rolling yard in such a way as to increase its diameter where the cloth of the sail comes, spaces

being left on those portions on which the leach-ropes or other ropes are rolled.

[Printed, 1s. 8d. Drawings.]

A.D. 1857, March 9.—N° 675.

SHARP, CLEMENT.—Ships' thimbles, &c.

The thimbles are formed from sections of iron tube which are heated and formed to the required shape in a press. The press is of the ordinary description and the upper and lower dies are similar. When together they are of the shape of the inside of a thimble.

"Heart shaped thimbles" may be formed by dividing a round thimble, straightening the ends and bringing them together. Or a press may be used in which a slide of the form of the sharp end of the thimble required is actuated by the descent of a wedge. A round thimble is heated and placed over the slide, behind which is a die of the shape of the rounded end of the thimble required. By the descent of the wedge the slide is driven outwards against the side of the thimble and causes it to assume the required "heart shape."

[Printed, 8d. Drawing.]

A.D. 1857, March 21.—N° 799.

COLE, JAMES EDWARD.—"Working the sails of square-sail vessels."

The lower mast terminates at the "round top" but the top-mast is continued some way down the lower mast and rests on a step therein. The "round top" is dispensed with, and the top-mast supported entirely by the back stays. Thus the yard can be sent down lower than with the usual rig. On the "front side" of the top-mast is a "rail bar" along which slides a clip carrying the yard. As there is no parrel a hoop may be put round the mast half way up it. The cap on the head of the lower-mast opens forward.

Above the lower yard is fitted a roller and below it a shaft. These two are connected by endless bands passing over pulleys on their ends, and motion is communicated to the shaft by an endless chain passing over a pulley on its centre and round a winch on deck. The sail is affixed to the roller. It is

preferred to put in the cloths of the sail "parallel with the sail or otherwise diagonally so that the doubled parts do not follow in the same place on the roller."

These improvements may be applied where the mast is of the usual construction and "the rail bar" "may be applied to the topmast by making it extend down to the round top, passing in front of the cap."

[Printed, 8d. Drawing.]

A.D. 1857, April 9.—N^o 1001.

KYNASTON, AUGUSTUS, FREDERICK.—(*Provisional protection only.*)—"Securing and disconnecting ships' boats and towing cables."

"The apparatus consists of a small capstan or windlass fitted to the boat, and worked by means of a system of pulleys or tackle purchase, in lieu of the bars or levers commonly used." "The head of the capstan or raised barrel of the windlass is grooved to receive parts of the rope of the afore-said tackle purchase, and to the smaller part of the barrel are fixed two projecting bolts or studs placed opposite to each other, or passing through the diameter of the barrel.

"The boat is suspended by the usual tackles, a short runner or pendant being attached to each of the lower blocks for purpose of lowering." "with this addition, that a 'cable eye' is spliced into the end of each short runner or 'pendant.' A bar is secured to each end of the boats' keelson, on which traverse two 'runner blocks' sufficiently large for the 'cable eyes' to reeve freely, after which they pass over the studs or bolts on the capstan or windlass, and to which with a slight pull of the purchase tackle thereunto attached they are effectually secured.

"The novelty of the invention, therefore, consists in the power given by the introduction of the aforesaid capstan or windlass of instantaneously disengaging the boat when she reaches the water, which is effected by simply letting go the 'purchase fall.'"

[Printed, 4d. No Drawings.]

A.D. 1857, April 28.—N^o 1195.

GILBEE, WILLIAM ARMAND.—(*A communication from Isaac Boss.*)—"Reefing and reducing topsails."

Four eyelet holes are made in the sail at the proper distance for a reef. From these lines pass to blocks on the mast-head and thence to the top. A similar line is fixed to a reef cringle on the leach, and leads through a block on the yard arm. For each reef a similar row of eyelet holes is employed. The number of holes may vary according to the size of the sail.

To strengthen the sail "running bands" are affixed thereon. The bight of a rope is sewn on the sail just above each of the eyelet holes, and the ends then brought together and sewn along the sail to its foot. These bands diverge slightly outwards from the centre of the sail. They may be on one or both sides of the sail.

[Printed, 10d. Drawing.]

A.D. 1857, June 20.—N° 1738.

LA BAW, GEORGE W.—"Operating the sails of vessels."

Parallel with the mast are arranged shafts, one to each sail, to which the sails are attached; these shafts are actuated by another parallel shaft connected with them by gearing so that they may be rotated and by their rotation may roll the sails upon them and so furl them. The actuating shaft is driven by a winch on deck or otherwise. It may be put in gear with all or any of the short shafts by means of a lever, worked by a line from the deck, and kept back by a spring when not in use. The sail is shaken out by ropes attached to the clews and passing over blocks in the upper and lower yard-arms.

[Printed, 6d. Drawing.]

A.D. 1857, June 25.—N° 1782.

CROCKER, ELIJAH JAMES.—(*A communication.*)—"Rigging of ships."

The invention relates to a method of reefing top-sails. A reef band is sewn across the sail. To this reefing lines are attached which are led through blocks on the yard to a block on the mast-head and thence to another on the centre of the yard where they are united and led as a single rope to the deck. To reef the sail the halliard is let go, and the yard lowered to a level with the reef-band when the lower part of the sail is supported by the reef-band and the lines attached to it.

In the Provisional Specification it is distinctly stated the reef lines are to be made fast to the centre of the yard, and not

M.

H.

led down to the deck, but the drawings and the description in the Final Specification appear to correspond with the above description, though it is also stated in one part of the Final Specification that the reef lines are to be made fast to the yard.

[Printed, 10d. Dr wing.]

A.D. 1857, July 25.—N° 2033.

COLLINS, JOHN SCOTT.—Reefing and furling sails.

For reefing topsails a reef-band or rope is fastened across the sail and to this reefing lines are attached which pass through blocks on the mast-head and are led down to the deck. It is stated that some of these lines may be attached to the yard, instead of being carried to the deck. The sail is reefed by merely lowering the yard, when the lower part of the sail is supported by the reef-band and lines. The reefing-lines for the courses are shorter “but work exactly on the same principle.”

Bands of canvas are sewn across the sail diagonally to strengthen it in square sails. In fore and aft sails the seams are diagonal instead of perpendicular.

[Printed, 10d. Drawing.]

A.D. 1857, September 1.—N° 2294.

GRAY, THOMAS, and GLADSTONE, GEORGE JOSEPH.—“Ap-
paratus for lowering and letting go ships’ boats.”

According to this invention, “in order to free a boat from its lashings or gripes, one end of each gripe or lashing has a bolt or pin passed through it, which pin is placed in a hole formed on the rail at the side of the ship or vessel. The lashings are made fast round the boat; hence when the bolt or pin is raised out of the hole in the rail, the boat is free of the lashings or gripes. In lowering a boat two dead eyes are used, one near each end of the boat, and in the centre of the boat are fixed logger or timber heads. Two ropes are used, one fixed to each davit; each of these ropes is passed through the three eyes of one of the dead eyes; it is then passed several times round one of the logger or timber heads. By these means the lowering is readily and safely performed. The lower blocks of the tackle by which a boat

" is suspended from the two davits are made with swivel eyes
 " or loops at their lower ends. Near each end of the boat is
 " a tongue or hinged catch, which passes through the loop or
 " eye of the blocks, and the two tongues or catches are secured
 " in a horizontal position, when through the eyes or loops of
 " their respective blocks, by an axis, which turns in bearings
 " in a direction fore and aft of the boat. The axis at each end
 " is made with a half-round hollow, so that when the tongues
 " are covered by such half-round hollows they are prevented
 " rising, but on turning the axis half round they are simul-
 " taneously uncovered, and the tackle at each end released."

[Printed, 10d. Drawing.]

A.D. 1857, September 21.—N° 2449.

ABSTERDAM, JOHN.—"Electric telegraphic tables."

After describing improvements in telegraph cables, the inventor continues:—"I would also remark that a cable composed of corrugated metallic wires and a flexible covering of gutta percha or other suitable material may be used to advantage for standing rigging for navigable vessels," "the elastic property of the cable in a longitudinal direction tending to keep the rigging down straight."

[Printed, 10d. Drawing.]

A.D. 1857, October 2.—N° 2530.

SHIBLES, GEORGE WEBSTER.—"Arranging and reefing the sails of ships."

"The mast carries in addition to the usual yard a rotatory spar set parallel with the yard, and fitted at each end with a spirally or helically grooved barrel. There are two lifts passed up the mast from the deck through eyes or guides in the top of the mast, the other ends of this tackling being respectively passed through terminal eyes on the yards, and thence wound round the grooved barrels on the spar." To this barrelled spar "the upper edge of the sheet" is attached, the whole being so arranged that when the spar is turned round in one direction to wind up the sail upon it, the two barrels wind up their tackle in the reverse direction." "Where the halyards are worked from the deck, the sheet is more or less reefed" by "slacking off or hauling up, for the

“rotatory barrel spar winds up or lets off more or less of the sheet” as required. “This arises from the fact that when a hauling strain is put on by the halyards, the barrelled spar is turned upon its axis by the tensional action of the ropes upon the barrels, thus unwinding a corresponding amount of sail, whilst when the reverse turn occurs from the slackening off, the reverse rotation of the spar takes up the sheet; the lifts passing up to the top of the mast answer for taking up any slacks which may occur.”

The parral may be formed of three rings round the mast, fitted with rollers or made with a smooth surface so as to slide easily. The rolling spar may be attached to the yard by bands of plaited rope or other flexible material. These bands are coiled on the spar and then led through blocks on the yard to the top, where they are made fast. Or the spar may be carried in journals affixed to the yard. The spar may be actuated through bevel wheels on the yard, instead of as above described, motion being given to a wheel at the centre of the yard from a pulley on the lifts.

[Printed, 8d. Drawing.]

A.D. 1857, October 12.—N° 2609.

CALVERT, WILLIAM. — “Obtaining motive power by the action of the wind.”

The apparatus may be used for the propulsion of ships, being caused to drive a propeller.

On the upper deck is mounted a circular platform, on which is fixed a chain barrel. Through the centre of this fixed chain barrel passes a vertical shaft which is mounted in bearings below so as to be capable of revolution. Surrounding the chain barrel is a ring mounted on antifriction wheels which run on a way on the platform. From this ring spars are extended laterally, and these are further secured by braces to the central shaft. At the end of each spar is pivotted a yard which carries a triangular sail, the point or head of which is secured to the mast above. On the pivot of the yard is a chain wheel, double the size of the fixed chain wheel on deck. An endless chain passes round each of the wheels of the yards and over the fixed wheel, by means of which an independent rotary motion is given to each sail as the whole apparatus revolves. Thus on one side the face of the sail is

exposed to the wind, on the other its edge, and the sail is thus "feathered" against the wind as the apparatus revolves. The number of sails may vary, but the number preferred is four. The position of the chain barrel may be altered by means of a rack and pinion, so as to adapt the sails to the direction of the wind. The sails may be reefed in any suitable way; one method may be by having lines run through earrings and thimbles across the sail midway of its length.

[Printed, 10d. Drawing.]

A.D. 1857, October 28.—N^o 2734.

SLOPER, JOSEPH.—"Obtaining motive power for propelling "ships or driving machinery."

Power from a wind wheel is transmitted to a propeller. The wheel consists of a number of sails or vanes mounted radially on a vertical spindle. The vanes are of curved form, and are jointed to the central framework so as to yield to the return stroke. For this purpose they may be supported by shoulder pieces on the frame, and by curved pins working through slots in the vanes. They may also be "feathered" in any suitable way, as by having pins on their ends working in excentric grooves or otherwise. The framework may be telescopic, so as to slide down and close up on the deck. The vanes may be of fabric stretched by rings on a frame, so as to be capable of being closed up. They may also be of laths like a venetian blind, and the laths may be caused to "feather" by any suitable contrivance. A "curved wind conductor" or screen may be adapted to guide the wind on to the vanes.

[Printed, 10d. Drawing.]

A.D. 1857, October 31.—N^o 2765.

GALLOWAY, GEORGE BELL. — Construction of merchant ships and other vessels, motive powers, propulsion, and boiler furnaces.

The inventor describes various improvements in the above-named subjects. After describing a life-boat he says:—"As "a means of lowering said small vessels when required," "I affix a sling with a leading block or thimble in the centre. Such sling is attached to each side, both fore and aft, of the boat or vessel. A rope fastened to a cleet or pin passes

“ through the leading blocks, which are secured to the bottom of the boat, and also affixed to the ring bolts fore and aft, and is the means by which the vessels are suspended and lowered.” A block or brake pulley is also described. “ Two pulleys are affixed in a groove or hollow channel, and a piece of wood is affixed between them, which acts as a break. The men have by this appliance complete control over the boat in lowering, and as soon as the boat reaches the water the men attending upon the lowering ropes have simply to let go the ropes, and the boat is then free and clear of the ship. This break, block, or pulley is placed at each end of the boat or vessel, and to add strength to the boat’s framing,” “ the block or pulleys being secured to the bottom of the boat by bolts, have an iron hoop or band also passing to each side of the boat, which is affixed to the planking, &c.” For lowering ordinary ship’s boats, a roller is fixed at each end of the boat under one of the seats or thwarts. “ The lowering rope, after passing through a block which is attached to the ring bolts fore and aft, is passed round the roller, say twice, which gives full power and command to the men in the boat.” “ This plan also obviates the necessity of any hooking tackles.”

[Printed, 8d. Drawing.]

A.D. 1857, November 13.—N^o 2858.

GIFFORD, WILLIAM JAMES.—Rigging ships and boats.

The sails are made of canvas in which the weft is of the usual size, but the warp is composed of larger and stronger threads. Bands or cords are sewn on the sail to strengthen it. They may be arranged parallel with the edges of the sail or diagonally across it, and are made to coincide on the opposite surfaces of the sail.

“ The topsails and all below them ” are “ divided,” that is, each ordinary square sail is divided along the mast. They are set on “ gaff yards,” which consist of a gaff with the jaws lengthened sufficiently to form the opposite yard arm. These jaws are connected by cross pieces, on which a spar travels, and to this spar the foot of one half the divided sail is affixed. The object of this is to allow the sail to be brought to either arm of the jaws, so that it may always be to windward of the

mast. The head of this half sail is attached to a spar swung on the upper yard. The other half of the sail is attached to the gaff on the other side of the mast, and above to the yard. The sail may be still further divided by making the first-mentioned half consist of two triangular sails instead of one square sail. The outer triangular sail may be set on the forestay of the mast, and the inner on a boom on the mast; there may be a sail on each forestay, and the inner sail comes over to each alternately as the ship tacks.

The "top riggers" are not "divided," but are hoisted to windward of the mast instead of in the usual way.

The lower sails "of the aft division" are fore-and-aft sails with a boom and gaff. The space between the gaff and the yard above is filled with a small triangular sail, or the cloths of the sail "may be taken of sufficient length" to reach the yard. In this case "the gaff is formed of duplicate spars" called gaff battens," with the sail between them.

The square and "divided" sails are reefed by lines arranged to gather them in at the centre to the mast. The fore-and-aft sails are reefed by brailing up a portion of them to the gaff and mast by means of lines and thimbles or eyelet holes in the sail.

A sail which may be used as a royal for a ship or as a boat's sail is stretched on yards connected by a cross piece which is pivotted on the top of one or two masts, so that the sail can be turned over and brought to lie against either side of the mast. In going on a wind it is to be kept to windward of the mast. It is not stated that any provision is made for sailing otherwise than close to the wind with this sail.

The top-mast is fixed abaft the lower-mast, to which it is secured by rings and wedges. "The gaff-yard" is "above" and outside the lower shrouds, and inside the topmast "shrouds," which "are rigged on to swing cross-trees." Instead of a top-gallant-mast a "gunter mast" is used. This "consists of a light spar tapering at both ends."

A swivel jib-boom is employed "pivotted at its centre on the" end of a short double sparred bowsprit."

Tapering spars are made by deeply notching the ends of beams and bringing the outside parts together.

A.D. 1857, November 30.—N° 2969.

GARDNER, JOSEPH, LEE, RICHARD, and PEARCE, HENRY GEORGE. — (*Provisional protection only.*) — “Self-reefing sails.”

“Below or on front of the topsail yard there is a roller or supplementary yard which revolves in suitable bearings connected to the topsail yard. The centre of this revolving supplementary yard is encompassed by a fast sheath or pulley which is grooved on the face (or edge), and to which one end of a line or chain is made fast, when the yard is resting on the cap, the other end of the line is then carried up to the mast head, where it may be made fast or passed through a sheath, hole or block, and thence carried down to the deck, where it is made fast. Then hoist the yard to the mast head by the hawlyards in the usual way. Wind on to the pulley of the revolving yard the slack of the line which is attached to it. Then take the topsail, which has the centre cloth removed down, to the close reef (or a little below), bend it on to the revolving supplementary yard, and then attach it to the lower yard by the sheets in the usual way.”

By this means, as the yard descends in reefing the sail, the revolving yard is rotated, and the sail wound thereon.

“A ‘save-all’ may be fitted to the front of the sail to cover the slit or opening made by the removal of a portion of the centre cloth, to allow the parbuckled or semi-buckled pulley to work through it.”

[Printed, 4d. No Drawings.]

A.D. 1857, December 12.—N° 3068.

CUNNINGHAM, HENRY DUNCAN PRESTON. — “Reefing and furling sails.”

Improvements upon N° 13,368, A.D. 1850, N° 1640, A.D. 1855, N° 596, A.D. 1857, &c.

Various methods are described for imparting rotation to the spar on which the sail is wound. A toothed wheel on it may engage in a chain fixed above and below, and guided by rollers fixed to the collar in which the wheel turns. Or the chain may take a half turn round the wheel, and both the ends may be carried upwards. Or the teeth of the wheel may engage

in a rack on the mast. Or two ropes may be fixed to the yard and rolled thereon in opposite directions. All these methods are equally applicable where the sail is rolled on the yard itself, or upon an additional revolving yard.

The fittings of the revolving yard where one is used, may be of wood and iron combined. The bearings for the roller on the yard-arms may be of wood bound with iron. The blocks may be "locked or clamped" on the yard instead of being let into it. The side of the fixed yard may be flattened or hollowed out, to admit the rolling yard to lie closer to it.

Reefing lines may be used both at the ends and at the middle of the yard.

To enable the sail to be rolled evenly on the yard, matting may be fixed thereon where the thinner parts of the sail come, spaces being left at those parts on which the ropes, &c. are rolled.

In addition to the apparatus above described, any ordinary reefing tackle may be employed in combination therewith.

[Printed, &c. Drawing.]

A.D. 1857, December 23.—N^o 3150.

KYNASTON, AUGUSTUS FREDERICK.—"Slip or disengaging hook."

The object of this invention is "to provide a hook which may with ease and certainty be released from any body to which it is attached, or which is attached to it, whether the pressure or pull exerted upon the said hook be great or small, uniform or variable, and also effectually to shield its point while supporting a strain, that it may not become accidentally disengaged." The "hook proper" is mounted on a pivot between two curved plates or guard pieces, and has connected to it a link or arm, which is jointed thereto at a point above the fulcrum, and has connected to its lower end the rope or chain which is to support the body suspended from the hook. The arrangement of these parts is such that on any strain being exercised upon the rope or chain, the hook is caused to turn upon its fulcrum and release itself from the eye by which it is suspended, but this is prevented, except at such times as a disengagement is required, by a "shifting pin or bolt" passed through the curved plates or guard pieces, or a cord passed round a small pulley on the shank of the hook,

and also round a similar pulley on the lower part of the link or arm. By withdrawing the shifting pin or bolt, or releasing the cord, the hook is immediately disengaged. The point of the hook, when secured to an eye or link, passes between the curved plates, which prevent it from being accidentally disengaged. In some cases, both the shifting pin or bolt and the retaining cord are used, and the invention is mentioned as being particularly applicable in "disengaging boats from their tackles when lowered in a sea-way or elsewhere, and again connecting them for hoisting up."

[Printed, 8d. Drawing.]

1858.

A.D. 1858, January 29.—N^o 158.

FOX, WILLIAM TRELEAVEN.—(*Letters Patent void for want of Final Specification.*)—"Bending and reefing of ships' and other vessels sails."

Galvanised iron chain is substituted for the rope used for bending on sails. On this chain are a number of links through which the jackstay is passed. "When the sail has been hauled up, by placing the jackstay (which is then connected to the sail) in a number of hooks or cleets fastened to the yard it is ready for use." "To the after side of the yards, at the earings" are affixed "small dogs to which are to be fastened the cringles (which may be made of a similar chain to the leeches) or reefs of the sail; when reefing by drawing the sail on to the yard," and fastening it to these dogs "it will be impossible for it to get under the yard."

[Printed, 4d. No Drawings.]

A.D. 1858, February 5.—N^o 219.

DYER, SAMUEL.—Reefing, furling, and securing sails.

Partly improvements on N^o 1023, A.D. 1856, and N^o 1860, A.D. 1856. The rolling jackstay and other improvements described in the above Specifications are used, but when tubular iron yards are employed they are formed of little more than a half circle of tube. Suspension claws are fitted thereon to

keep the rolling yard within the tube. The reefing chains are formed into an endless chain which is led along the yard and over bosses on the ends of the rolling yards as in the former Patents. To the bights of the chain which hang from blocks on the mast, blocks are fitted from which downhauls pass to the deck. The sail reefs itself by the weight of the yard, and can be entirely furled by hauling on one down-haul, while it is set by hauling on the other.

The parral is fitted with rollers or "these rollers may be substituted by using a tongue of hard wood, hung in the middle by a bolt in the rolling chock on the fore side of the mast, and one on the clamp pin on the aft side so loosely as to hinge freely whenever the yard is disposed to cant forwards or aftwards."

Motion may be given to the roller by gearing from a wheel on the standing yard, revolved by the reefing chains. Or there may be a rod, running along the yard, and having a boss on its centre round which the reefing chain passes. This rod transmits motion by gearing to the rolling jackstay.

The rolling jackstay may be on the fore side of the yard, and there may be a "long bucket with two parrel hoops or two bucket parrels" to prevent the yard from canting. The lower yards may be close on the truss and the stay fixed to a shackle thereon. By this means the foot of the topsail may be cut straight, as it has not to clear the collar of the stay.

For working heavy courses, a capstan may be used "having two handles working pinions, which are fixed on an axis or axes," formed by elongations of the handles "such pinions gearing with and giving motion to a bevil wheel on the head of the capstan."

For the clews of the sails "the spectacle clew" is used, with clip-hooks and a toggle which may receive a link of the chain when the sheet breaks.

Jib-hanks as described in N^o 179, A.D. 1857 are used. The hank is secured on the sail and has a slit shoe which passes over a flat plate on the stay but holds fast on the stay itself.

A sloop's sail is figured, which is reefed by revolving the boom by gearing. The sail is slit, and the opening secured by a bonnet provided with hanks like the jib-hanks last described.

For the "eyes of the rigging of top-gallant and royal masts" a tube of iron is used "having a shoulder round which the

“ rigging is fitted,” so that the mast may be struck while the rigging is left secured to the cap.

A fid is used “ which consists of a block of iron having two
“ holes for the ends of two setting screws to fix in, the setting
“ screws are fitted into two plates of iron in the trussle-trees ”
“ and the fid is brought to rest upon their points.”

For tightening the rigging a chain plate with a worm and screw is used, the end of the rigging being made fast to the screw.

In boom sails “ the topping lift and sheet block can be both
“ attached to the boom-end by means of a spectacle plate
“ having a hole for the centre or axis of the boom,” another
for each lift and another for the sheet.

A “ jaw of iron having a double hinged neck ” is used for the gaff.

In top-sails, “ instead of a permanent fairlead for the clews,” the inventor uses the “ topmast studding sail haulyards, which
“ are rove in a sheeve hole or block at the topsail yard-arm
“ the usual way, and when not in use as a studding sail haul-
“ yard, the end is rove through the bulsseye at the clew of
“ the sail and made fast to the lower yard, it then becomes a
“ guide for the clew of the topsail.”

[Printed, 1s. Drawing.]

A.D. 1858, February 27.—N^o 392.

CAVE, WILLIAM.—(*Provisional protection only.*)—Propelling vessels, &c.

A windmill is used to propel vessels by means of a screw or paddles.

“ The peculiarity in the form of wind wheel to be employed
“ for these purposes consists in having the vanes or floats
“ placed with their superficial surface parallel to the line of
“ the axis upon which the wheel turns instead of at an angle
“ thereto as hitherto practised. The axis of the wheel may be
“ placed either in a vertical, horizontal, or inclined position as
“ may be found expedient, and, if found requisite, one-half of
“ the wheel may be enclosed in a case or guard, which should
“ be moveable, so as to expose either side to the action of the
“ wind according as the motion may be required in one direc-
“ tion or the other. In propelling vessels, carriages, or

“ machinery, either one or several of these wind wheels may
“ be used, and they may be employed either as an auxiliary
“ to or in lieu of the ordinary motive power.”

[Printed, 4d. No Drawings.]

A.D. 1858, March 10.—N^o 481.

DAVIES, GEORGE.—(*A communication from Mortimer M. Camp.*)—“ Eye or ring bolt.”

“ This invention consists principally in so constructing an
“ eye or ring bolt, that a hook, line, or other fastening may be
“ released from the the bolt with greater facility and in less
“ time than from those of the ordinary construction. The
“ lower end of the body of the bolt is formed into a shank,
“ and has a screw thread cut upon it as usual. The head of
“ the bolt is formed of two jaws and a tongue. The tongue
“ works at one end upon a pin in one of the jaws, and the
“ other end thereof is formed into a tenon to fit the mortice
“ in a holdfast. This holdfast is forked at its lower end to
“ work upon a pin in the body of the bolt, and is morticed at
“ its upper end to fit upon the tenoned end of the tongue.
“ There are a pair of knuckle-jointed levers (the lower end
“ being jointed to the body of the bolt, and the upper end to
“ the upper part of the holdfast), by the closing in of which
“ the holdfast is moved over and upon the tenoned end of the
“ tongue to retain the latter securely in its position, and by
“ the opening of which the holdfast is withdrawn so as to
“ allow the tongue to be thrown up, and the line or other
“ fastening enclosed within the eye to be released.

The bolt may be used for lowering ships' boats.

[Printed, 6d. Drawing.]

A.D. 1858, March 23.—N^o 606.

CLIFFORD, CHARLES.—“ Improvements in ships' davits, and
“ in apparatus for stowing, lowering, and securing boats.”

“ According to this invention, in place of employing a pair
“ of davits of the ordinary description for raising and lowering
“ boats, a single davit having two heads is used. This davit
“ consists of an upright pillar carried by bearings at the ship's
“ side, and furnished with two arms, which, as they spring
“ from the pillar, make an obtuse angle one with the other.

“ The arms at their ends are fitted up like ordinary davit heads, and are stiffened by ties running to the top of the central pillar. By using a davit of this construction a boat may be turned from out-board in-board, and vice versa, simply by causing the pillar of the davit to make a semi-rotation in its bearings. In order to complete the stowage of the boat, it is (after turning it in-board) secured by a lashing so arranged as to hold the boat safely while the davit is turned in-board, but be disengaged when it is turned out-board to lower the boat. The lashing is connected to the two heads of the davit, and passes down from each of them under the boat till the two parts meet at a point near the pillar of the davit, and at this point an eye is formed; this eye is connected with another eye passing over a prong on the outside of the ship by a cord passing two or three times through each of the eyes, and the cord in passing from one eye to the other passes partly round the pillar of the davit, consequently when the davit is turned out-board the cord becomes slack and allows the eye to fall off the prong so as to disconnect the lashing; or the apparatus may be so arranged that the semi-revolution of the davit by drawing a pin from a socket, or in other manner, disengages the lashings.”

In the Specification of a former patent by the same inventor (No. 895, A.D. 1853) a method is described by which ropes from the davits pass round a roller in the boat, and are secured merely by their ends passing through a hole in the roller. By an improvement a slot is made in the roller “from the periphery to the centre line and at right angles to the hole through which the ends pass.” In this slot is fitted a tongue hinged at one end. This tongue may be placed over the ropes in the slot, and the ropes wound over it so as to keep it down until the ropes are all uncoiled from the roller.

“The boat when out-board may be secured by self-liberating lashings” as described in the Specification of a former patent by the inventor (No. 1438, A.D. 1856).

[Printed, 10d. Drawing.]

A.D. 1858, April 9.—N^o 769.

TALBOT, WILLIAM, the Hon.—“Apparatus to facilitate the lowering and detaching of boats from ships or vessels.”

According to this invention, each hook or support of the boat "is formed by two levers, one end of each of which is " connected by a pin joint to the other, whilst the axes of " motion of these levers diverge therefrom, and are the points " of their suspension from two separate links, which hang " from a ring common to both. The lower ends of these levers " are bent into the form of a hook, and are capable of lying " one across the other, when by a ring or otherwise a weight " is applied to their hooked ends, and they are caused thus to " cross each other. In that position they form a secure " support, but as soon as the weight is released therefrom the " tendency of these levers is by their form to open or separate " at their hooked ends, and clear the ring or other attachment " by which they held the weight." The eyes or rings into which the hooks take are fixed to the thwarts, one near each end of the boat, and in order that the ends may be released simultaneously, "a cord, or chain, or other like-acting connection" is passed "under two pulleys to two of such compound hooks, in such manner than when one of them has " become released from one end of such cord or chain, &c., " the other may either draw away the cord or chain, or other " such connection, or, by the relief of the weight, become " released as the other."

[Printed, &c. Drawing.]

A.D. 1858, May 25.—N^o 1165.

WEBSTER, WILLIAM.—"Rigging vessels."

The masts are made "each of one piece of timber, and" they are secured by wire shrouds placed at "large angles to each " other, and so that the lower ends of the after shrouds of the " foremast will be immediately contiguous to those of the " forward shrouds of the mainmast, and so with the others." The yards "are secured to the masts by hinged truss bands, " having clamp screws to hold them at any desired point on " the mast." They "are held in bands hinged to a bolt, " which rotates in a yoke attached to the band which grasps " the mast; this attachment allows motion to be given to the " yards in any required direction. The lifts are attached to " hinged slide bands clamped to the mast at the proper " distance above their respective yards. The bolt of the " hinge of these bands has a ring at its lower end, to which

“ the chain slings of the yard are hooked. There are eye bolts on the sides of the bands, to which the lifts are attached. The bands of the topsail yards are split for the reception of a grooved hoop or ring, which may be rotated in them as a sheave is rotated in an ordinary pulley. The yards work inside the shrouds, and can be hoisted up or lowered down upon the rail,” “and when on the rail, can be pointed nearly fore and aft.” “The topsail yard may be rotated on its own axis in its band by means of the annular sheave” “moving in the slit in the band.” The bowsprit is made to run inboard. The masts have no stays. The bowsprit is not connected “to the masts by anything more than a small cord, which will yield to a less force than would be required to carry away the bowsprit.”

[Printed, 8d. Drawing.]

A.D. 1858, May 29.—N° 1216.

HEBSON, DOUGLAS. — (*Provisional protection only.*)—
“Ships’ gear.”

The following is the whole Specification :—

“The object of this invention is the construction of masts, yards, and other spars, and the standing rigging for ships or other navigable vessels, of the necessary strength, with considerably diminished weight and bulk as compared with those now in use, and consists in forming them wholly, or in major part, from steel or other metal, prepared from iron, having like proportions, which may be used alone or in combination with wood and iron in the formation of masts, yards, and other spars; and in the formation of wire rope, to be used for standing rigging and for other ordinary purposes, from steel, or other metal prepared from iron, having like properties, to which iron wire and other rope is now applied.”

[Printed, 4d. No Drawings.]

A.D. 1858, July 1.—N° 1475.

PEARCE, HENRY GEORGE.—(*Provisional protection only.*)
—Reefing sails.

“An horizontal supplementary spar is fitted across the sail equidistant between the head of the sail and the close reef.
“This supplementary spar is attached to the sail, and is sus-

“ pended at the ends on axles by ropes or chains, which reef
 “ through blocks or chocks on the top sail yard arms, and are
 “ carried to the centre of the yard, where they are passed
 “ through blocks or chocks, and carried into the deck for con-
 “ venience of working. Or these lift ropes may be carried
 “ from the centre of the yard up to the crosstrees or
 “ topmast-head, and thence through blocks or hocks to the
 “ ‘top’ or deck. The centre of this supplementary yard,
 “ which revolves, is fitted with a boss to receive a ‘parbuckle,’
 “ one end of which is attached to the supplementary revolving
 “ yard, and is passed several times round it, and from thence
 “ to a hole or block at the topmast head, and down to the
 “ deck, where it is made fast, thereby causing the sail when
 “ dropped down to roll itself up both from above and below,
 “ and when hoisted to unrol itself as the sail is elevated.

“ The supplementary revolving yard is connected to the
 “ mast by two hoops, which are connected together and
 “ encompass the yard on each side of the parbuckle rest,
 “ and are secured to a ‘parral’ or hoop that works on the
 “ mast. The sail is split in the middle from the upper yard
 “ to a little below the close reef, to admit the centre gear
 “ to work through it. The edges of the split of the sail are
 “ roped and held together by means of connecting link-
 “ travellers, and which are attached to the hoops which en-
 “ compass the yard, and traverse up and down therewith as
 “ the sail is hoisted or lowered.”

“ If the supplementary revolving yard be fitted to the centre
 “ of the sail and attached to a ‘jack stay’ in place of the mast,
 “ the whole of the sail might be rolled up on the rotating
 “ spar.”

[Printed, 4d. No Drawings.]

A.D. 1858, July 9.—N° 1545.

SIMONS, WILLIAM.—Ship-building.

Amongst the improvements described, the following relate to this series :—

The housing of topmasts is made in the interior of the iron
 lower masts instead of outside. “No cap or truss bow is re-
 “ quired and the fid is placed through a square hole in the
 “ lower mast head, and into a square notch in the top mast

“heel, which is thus prevented from turning. “The futtock shrouds are reversed, and fastened up to the top of the lower mast; the lower yard is higher up the mast than usual. Or the futtock shrouds and the top may be dispensed with and the top-mast shrouds carried down to the deck. “On the “same principle topmasts may be fixed to the funnels of “steamers.”

The sides and interiors of hollow iron masts may be used for various purposes. Winches may be affixed to them, with gearing inside or outside the mast. The ship's pumps may be fitted inside the mast. The mast may serve as a passage to the hold, the between decks, &c. and have a manhole in a convenient position. It may contain an auxiliary engine boiler. It may be used to lead a telegraph cable through in laying. It may serve as a pipe to supply water, or may contain the boiler pipes or any of the discharge pipes. “Standing or running wire or hemp rigging” may be lead through the mast. It may serve as “a hatch trunk communicating with the lower hold.”

Davits are made of T-iron “rolled with round edges.”

[Printed, 1s. 2d. Drawings.]

A.D. 1858, July 10.—N° 1554.

WAIN, GEORGE HENRY.—“Reefing and furling sails.”

At any part of the sail a horizontal spar is attached across it. This spar is suspended by ropes coiled round its ends and led through blocks on the yard arms to the mast-head and thence to the deck. There are also other ropes, coiled in the opposite direction, and connected to a down-haul leading to the deck. By means of these the spar is rotated, and by its rotation the sail is rolled on it and so reefed. The spar may also be supported on a support at its centre, and in this case the sail is divided down its centre. A band of canvas is then attached to the spar “the end of which is made fast to the “round top and held in its place” by a roller on which a ratchet is cut, engaging with a pall, to be thrown out of gear by a line attached.

If the spar is placed near the foot of the sail, the lower part of the sail is divided from the rest, and is wound on a separate spar hung from the first-named one.

Also the spar may be carried in bearings with a hollow yard, slotted to allow the sail to pass. In this case the actuating tackle is suitably modified, but acts as above described.

[Printed, 10d. Drawing.]

A.D. 1858, July 13.—N° 1576.

BEADON, WILLIAM. — (*Provisional protection only.*) —

“Bags for corn and other articles, and sails for ships.”

The entire Specification runs as follows :—

“This invention has for its object improvements in the manufacture of bags for corn and other articles, and sails for ships. For these purposes in place of such bags and sails being woven wholly of yarns of fibrous vegetable substances, as heretofore, metal wire is introduced, together or in combination with such yarns of vegetable fibrous substances, and they are woven into suitable fabrics for making bags and sails, by which not only will greater strength be obtained, but in respect to bags to contain corn or seeds or other matters which are liable to be attacked by rats and mice, such bags will be rendered less accessible.”

[Printed, 4d. No Drawings.]

A.D. 1858, August 2.—N° 1748.

MORTIMER, CHARLES. — (*A communication.*) — (*Provisional protection only.*) — “Raising and lowering ship’s boats.”

The following is the whole Specification :—

“This invention has for its object improvements in apparatus for raising and lowering ships’ boats. For this purpose the lower blocks of the ordinary davit tackles have attached to each of them a metal ball or globe, which fits into a corresponding socket fixed to the boat; and these sockets are so placed that whilst the weight of the boat is on the tackles, the balls remain firmly held by the sockets; but when the weight of the boat is taken off the tackles by the sea, the balls fall freely out of the sockets, and the boat goes free; thus the difficulty that at present exists in unhooking the tackles, and the danger consequent thereon, is avoided. In order to prevent the balls falling out of the sockets before it is required to release the boat, each

“ socket is provided with a catch, which retains the ball in
“ the socket even when the weight of the boat is taken off the
“ tackles until the catch is withdrawn.”

[Printed, 4d. No Drawings.]

A.D. 1858, August 23.—N° 1913.

HIGGINS, LEWIS, and BROWN, ALEXANDER.—Reefing sails.

Two methods of reefing sails are described. In the first, the yard is mounted in bearings at its end, the bearings being supported by metal rods fixed to the parral. It is also supported at its centre by a pair of jaws in which antifricition rollers are mounted. A rope is wound on each end of the yard, carried through a block mounted on the bearings of the yard-arm, and thence led through blocks on the mast-head to the deck. On letting go the yard the sail is rolled on the yard by the action of these ropes.

The second method is thus described :—“ Across the front
“ of the sail at, say the line of the close reef points, attach a
“ stout rope and work it into the side leach ropes with a
“ suitable eye at each end; then take two, or any other
“ suitable number of ropes and attach them to the horizontal
“ rope, carry them vertically down to the foot rope of the
“ sail, secure them to the foot rope and the sail, and so fit
“ the upper end of these vertical ropes that the upper end
“ of the ropes are passed through the sail, that a thimble may
“ be worked into each; make fast a buntline to the top of each
“ vertical rope and to each leech of the sail at the ends of the
“ horizontal rope described; carry each buntline vertically
“ up the back of the sail to the upper yard where pass each
“ line through a cheek block” “ attached to the yard, then
“ carry all the buntlines a little distance upwards, form them
“ into a loose pennant,” “ then pass it through a suitable
“ block on the mast head,” whence the line may be led to
the deck.

When the yard is let go, the lower part of the sail is supported by the lines, and the reef points may be taken up in the usual way.

[Printed, 8d. Drawing.]

A.D. 1858, August 27.—N° 1941.

CLARK, WILLIAM STETTINIUS. — (*A communication from Louis B. Wakeman.*) — (*Provisional protection only.*) — "Reefing or furling sails."

The sail is wound on the upper yard by means of ropes coiled on barrels at the ends of the yard. On the yards outside these barrels are "swiveling bands" provided with arms carrying blocks through which the ropes are led to blocks at the mast-head and thence to the deck. To each swivel band is affixed a boom iron for carrying the booms for the studding sails. At the inner ends of the booms are drop hooks which take into eyes in the truss bands, so that the booms when slid in may serve to protect the reefed sail from chafing against the shrouds, &c. The yard is supported by a "smooth-faced clamp" fixed to the truss band. This clamp is formed of two pieces connected by a screw which embrace the yard, leaving an opening for the sail. The screw bolt is carried upwards and forked, so that it may receive two blocks for the "rolling halyards."

[Printed, 6d. Drawing.]

A.D. 1858, August 28.—N° 1954.

BRABAZON, JAMES DUPRÉ. — "Giving motion by sails to screw and other propellers of ships."

A shaft is fitted on supports on deck, preferably so as to run in a direction fore-and-aft of the ship. On this shaft are arms, at the end of each of which is a spar carrying a short yard with a sail upon it, the sail being distended between the radial arm and the yard. Lines are fitted by which the sails may be set in any required direction to suit the direction of the wind. Stays are fitted to connect the ends of the radial arms.

The power thus obtained is transmitted to a propeller by an endless band over a drum on the shaft, or otherwise.

[Printed, 6d. Drawing.]

A.D. 1858, September 3.—N° 1998.

ROBERTSON, JAMES. — "Driving belts and springs."

This invention relates to "the application and adaptation of corrugated, undulated, or indented plate or sheet metal

“to the construction of driving belts and springs.” “Corrugated, undulated, or indented metal plates or sheets may be arranged to act as springs in various ways.” In the springs described “the spring or elastic motion is called into play by spreading out or elongating the corrugations, undulations, or indentations, and exhibits itself in contracting or tending to contract them to their original forms.” “The various modifications of the improved springs may be divided into two classes accordingly,” viz. “tension” springs, and “compression” springs. Compression springs may consist of several corrugated plates alternated with flat plates, or of corrugated plates alone, arranged with the corrugations coinciding with, or crossing each other. These plates may sometimes be round, to form “washer” springs, and the corrugations may be disposed radially. Compression springs may be adopted in “connecting parts of pieces generally united in a solid or rigid manner,” but in which “a slight elasticity or yielding power is or may be considered desirable.” “As an example springs may be applied in this way to the masts and other spars of boats and ships.”

One method in which such springs may be applied is figured. The mast, &c. is divided across and the opposite ends of the pieces fitted with flanges. These flanges are then rivetted together with springs between, so as to allow a slight play to the mast, &c.

No application of “tension” springs to purposes connected with this series is mentioned.

[Printed, 2s. Drawings.]

A.D. 1858, October 4.—N° 2205.

TREVITHICK, FRANCIS. — “Applying sails and keels to boats and vessels.

Sails are made of strips of thin sheet metal, preferably copper, connected by “chains or wire ropes stretched between yards or booms.” The strips may be vertical or horizontal. For fore-and-aft sails the strips are vertical and are arranged so that the connecting chains “wind round a revolving mast.”

The rest of this invention does not concern this series.

[Printed, 10d. Drawing.]

A.D. 1858, October 12.—N° 2274.

BEADON, GEORGE.—Ship-building.

The mast of a vessel may pass through a turntable at the level of the deck. To this turntable it is firmly secured. Under the turntable are friction rollers on which it works. The mast is secured by shrouds fixed to the top and to the turntable. It has a "framing for extending the sail on each side "laterally." The yards are vertical and slide in grooves in the frame. They are drawn out sidewise by halliards passing over pulleys in the frame. The sail unwinds from a jackstay along the mast. There is a "funicular prop extending from "the fore part of the mast," and side props from this prop to the yard-arms.

[Printed, 10d. Drawing.]

A.D. 1858, November 1.—N° 2435.

PERLEY, CHARLES.—"Disconnecting boats from the davit "blocks."

This invention "consists in a block or its equivalent, "attached to the article itself, or to the rope or chain which "sustains or regulates the movement of the boat or other "article, the same being provided with a lug that receives a "link to sustain the article," the block being provided with a "drop," or "blocking piece," so fitted that the link is thereby retained in the block until such drop or blocking piece is raised, when the parts will be disconnected, "thus providing a means "by which the officer in charge can disconnect a boat at the "right instant to prevent swamping, or a sail can be dropped, "or any other weight that is raised or controlled by a chain "or rope can be disconnected, at the right time and with great "facility."

Different modifications of the invention are described, the "drop" being raised by a cord connected thereto, or other convenient means.

[Printed, 6d. Drawing.]

A.D. 1858, November 20.—N° 2640.

JORDAN, HENRY.—"Navigable vessels."

This invention relates to improvements in the construction of the hulls, masts, yards, and other spars; in the trusses and

portions of the standing rigging; and in the ventilation of vessels.

The improvements in masts, yards, and other spars "relate to those formed of tubular iron or steel, and consist in forming them in suitable and convenient lengths, and attaching them together by flanged or socket joints, or both, for convenience of stowage," &c. By this arrangement one half of a yard may be used as a topmast, jibboom, or other spar." It is preferred to construct the yards "in about six or seven feet lengths, reducing their diameter from the centre of the yard and inserting the inner end of the outer length into the outer end of the inner length" so that "the riveting may be performed on a mandril and the rivets inserted from the outside."

When the improved yards are carried as spare yards in ships with wooden masts it is proposed "that they should be placed vertically on the fore part of the lower masts, and used as ventilating shafts, by placing the flange on the top of small combings on the deck, to which they are secured by screw bolts through the flanch." It is preferred to form these improved spars of corrugated metal, for the sake of strength.

The improved truss "is formed of a straight bar of iron, steel or other metal, jointed to the mast, so that it has an horizontal motion, and the outer end which is round is passed through a hole in the centre of the yard, and upon which the yard can be peaked or turned. There is a collar or shoulder on the truss bar abutting against the after sill of the yard to prevent it falling in to the mast, and a loose collar and pin are fitted on the fore side to prevent the yard being unshipped when in use." When this truss is applied to double top-sail yards, "it is formed with a supporting bracket, as the ordinary slings cannot be applied to double topsail yards."

The improvement in standing rigging "consists in substituting single straight bars of steel, 'puddled steel' or 'homogeneous metal,' in place of the hempen or wire rope now used for that purpose."

The improvements in ventilation "consist in introducing a series of perforated pipes or tubes of wood or metal running round the vessel below the deck beams, and in various *directions over the ship*;" "these pipes are carried to and

" open out into the interior of hollow masts, which masts
" below the cap are provided with openings fitted with closing
" slides that may be worked from the deck of the vessel."

[Printed, 10d. Drawing.]

A.D. 1858, December 1.—N° 2752.

LEWIS, JOHN.—"Attaching sails to the yards."

Along the yard is fixed a strip of wood with an "overhanging
" edge." Under this edge the bolt rope of the sail is laid,
and secured there by the application of another strip which
fits under the edge of the first. This strip is secured to the
yard by pins working in diagonal slots in it, so that it can be
"wedged up" into position. It is kept in place by screws.

To secure the sail "between the metallic bands round the
"yards" or in other places, metal clamps are used. These
clamps grip the bolt rope, and are fastened to the yard by a
screw with a T head working through a slot in the clamp so
that the clamp can be removed by a half turn of the screw.
The life lines can be attached to eyes in these clamps or in the
screws which hold the jackstay above mentioned.

For securing the corners of the sails a "band clasp earring"
is used which slides on the end of the yard. It can be opened
to put it through the thimble at the corner of the sail, and
clasped by a screw. It is slid along the yard to tighten the
sail and then screwed down. It may be made in links, so as
to fit different sizes of yards.

[Printed, 6d. Drawing.]

A.D. 1858, December 21.—N° 2913.

LIVINGSTON, ROBERT McLEAN.—(*Provisional protection only.*)—"Self-detaching 'safety hook' or 'coupling.'"

This invention is applicable to the raising and lowering of
ships' boats. It consists of two hooks mounted upon the same
pivot, and having projections above the pivot to which weights
are attached. When a boat or other article is suspended from
these hooks, the hooked parts are kept together by a chain
passing from one to the other, but, when it is requisite to dis-
engage such boat or other article, the chain is disconnected
from one or other of the hooks, and the weighted parts of the

latter then cause them to move asunder, and effect the requisite disengagement.

[Printed, 6d. Drawing.]

A.D. 1858, December 21.—N° 2914.

DANDO, WILLIAM ELBERT.—“Apparatus for lowering boats “ from ships or vessels, and also for raising the same.”

In this invention, a “double-acting crane” is mounted on pivots outside the vessel to which the boat belongs, this crane consisting of two main posts, each having upon it a moveable arm, and the boat being suspended by ordinary means from these arms. When the boat is not required for use the main posts of the crane are retained in nearly a vertical position by chains, which acting in conjunction with suitable levering apparatus, permit the crane to turn upon its pivots when it is necessary, and so lower the boat to the water; the same apparatus is capable of again raising the boat when necessary. Suitable safety hooks or couplings may be used with this apparatus if desirable. By this means the boat is carried out away from the ship, and deposited in the water some distance from its side.

[Printed, 8d. Drawings.]

A.D. 1858, December 22.—N° 2928.

SHULDHAM, MOLYNEUX.—(*Provisional protection only.*)—
“Ships and vessels.”

The invention consists “in methods of running in or hoisting up a ship’s bowsprit, with its jibboom and flying jibboom,” so as to enable any vessels, “when constructed as steam rams” “to carry sufficient head sails.”

The first arrangement is for housing the bowsprit by means of “an inverted railway;” “the rail is fixed to the bowsprit, and the rail wheels are fixtures in the interior of the vessel, of a sufficient number to bear the weight of the bowsprit throughout the line of its course, the inclination of the rail to the plane of flotation sufficing to allow the bowsprit to run down by its own gravity, a certain description of brake being provided, to modify any accelerated motion caused by the vessels’s pitching. All the rigging and gear of the bowsprit and jibbooms are contrived to slip off, as they run “in.”

According to the second arrangement the bowsprit with all its appendages is hung upon pivots or hinged so as to permit it to be hoisted up from the outer end, and either to be secured to the fore-mast or steadied by guys.

Or by a third method the "housing" of the bowsprit is made "to circulate between the fixed rings, the bowsprit working round a bolt fixed in the centre of the circle, and which can be firmly fixed and secured to any part of it." The fixed rings should be placed high enough above the fore-castle deck to be clear of all obstructions, and by the help of purchases or other mechanical powers, the bowsprit could be placed at a right angle to the keel of the vessel or at any one abaft it until it was stopped by the ship's yards or rigging." The fore-stay, "spring stay," and fore-topmast-stay are attached to the head of the vessel, the "fore-topmast stay-sail stay and jib stay" are rove through leading blocks on the fore-top-mast head, so that the slack may be hauled in as the bowsprit runs in. The inventor says, "some of my plans regarding my method of removing the bowsprit and the jib-boom's rigging and gear are applicable to topmasts and top-gallant masts' standing rigging."

[Printed, 4d. No Drawings.]

A. D. 1858, December 30.—N^o 2996.

KNOWELDEN, JOHN, and EDWARDS, RICHARD DOWNES.—
"Hydraulic engines."

Among other purposes, the apparatus may be used for hoisting sails. The inventors say :—"The object of our invention is to construct a hydraulic engine or apparatus for the purpose of obtaining or applying motive power for various purposes, and which will, when desired, check or soften the effect of any sudden extraordinary or violent action or strain."

"For this purpose we construct the engine or apparatus with one or more cylinders fitted with piston or ram rods, valves, &c." "and, when desired, we arrange with the apparatus an air-chamber for the purpose of arresting, checking, or softening, by means of a volume of compressed air, any violent action produced by the sudden stoppage of the water or by the weights to be moved or stayed." For motive power "we prefer to employ three cylinders, with

“ three piston rods, actuating one crank and shaft, and in
“ order to economize the water, we construct the crank with
“ a slot or otherwise, so that the crank pin may be readily
“ moved to or from the centre of the crank shaft, and thus
“ regulate the length of the stroke of the piston, according to
“ the weight to be moved ; or we effect the same object of
“ economizing the water by means of geering or taper drums
“ or cones, and a strap, so as to lose or increase the leverage
“ according as the weight is light or heavy.” “ In lowering
“ weights ” “ we still further economize the water and power
“ by causing the lowering weight to force the water into the
“ main or into a cistern for any purpose, or so as to operate
“ upon the same or another apparatus employed in raising
“ weights.”

[Printed, 10*d*. Drawing.]

1859.

A.D. 1859, January 25.—No 223.

JOHNSON, JOHN HENRY.—(*A communication from Peter H. Niles.*)—“ Apparatus for cutting and shaping wood.”

The apparatus is intended specially for turning masts and tapered spars, but it may also be used for the production of other similar articles. The stick of timber is held stationary in a suitable framework, while the cutters travel along it, revolving as they go. The stick is supported at intervals along its length by props which retire as the cutters approach. This movement may be effected by hand or automatically by eccentrics worked by projections on the cutter carriage. “ The
“ cutters are fitted in radial slots in a spur wheel, having a
“ central aperture made therein for the timber to pass through
“ as the cutter carriage and cutters travel along it, for which
“ purpose the cutter wheel is fixed on to the end of a hollow
“ or tubular shaft, of sufficiently large bore to receive the
“ largest articles to be operated upon, and allow it to pass
“ freely therethrough. Immediately behind the cutter wheel
“ is another wheel of the same size, but having slots made in
“ an inclined direction, into which inclined slots the shanks

“ of the cutters enter. Both of these wheels are formed with spur teeth,” “and when they are both revolving together their cutters will remain at a certain fixed distance from the centre ; but when the hind wheel is made to turn in advance of the other slightly, its inclined slots will cause the cutters to move outwards or inwards, as the case may be, and thereby produce the required taper of the mast or spar, or other article. This expanding movement of the cutters is effected by means of three spur pinions connected with levers and arms worked by an inclined pattern slot in such a manner that one of the pinions which gears with the hind cutter wheel with the inclined slots shall move bodily to and fro when requisite, thereby turning more or less in one direction or the other the hind cutter wheel, and expanding or contracting its cutters. The second spur pinion acts as a carrier wheel, and gears into the first pinion and into the third, which latter gears into the front cutter wheel, and has a fixed in place of a moveable centre. The hollow cutter shaft is rotated by means of an endless chain, and the cutter carriage is made self-traversing by using a spur pinion driven from a wheel on the cutter shaft, and engaging or not as required with a rack fixed into the bed of the machine.”

[Printed, 10d. Drawing.]

A.D. 1859, January 27.—N^o 248.

CUNNINGHAM, HENRY DUNCAN PRESTON. — (*Provisional protection only.*)—“ Rig of ships or vessels.”

The rig is specially adapted for vessels with propelling machinery, as it is intended to offer less resistance to the wind aloft than the usual rig. To this end, the inventor says :—“ I use a system of double-gaff or other fore-and-aft sails ; that is, instead of in the case of main or fore trysail of a schooner, one gaff and one sail being on the mast, I use two, one alongside of the other, each gaff or sail being independent of the other.” On a wind one only of these sails is to be used, but before the wind both are set. “ Double trysail masts may be used, so that each sail shall have its own mast.” Or, if the sails are fitted with brails, so that they can be taken in without lowering the gaffs, “ each gaff could be fitted on its own axis at its end, the axial points being placed as far aft as possible.” “ The

"heads of the sails may also be fitted to haul out and in on the gaffs by hoops or metal travelling rods, or grooves both on the masts and gaffs may be used." When the vessel is steaming against the wind, both gaffs are placed together, fore and aft, and therefore do not offer the same resistance to the wind as a yard.

[Printed, 4d. No Drawings.]

A.D. 1859, March 14.—N° 640.

WALLER, RICHARD.—"Joining leather, flexible and textile materials for the production of boots and shoes, and articles of the like description, and harness, strapping, bags, sails, tent covers, portmanteaus, and such other articles."

The Specification describes machinery for manufacturing and boots shoes, but it is also stated that the machinery may be used "for various purposes, namely, that of rivetting long pieces of strong fabrics, such as sails for vessels," &c. The modification by which the machinery is adapted to this purpose is not very specially described, but it appears that the breadths of canvas are "stretched to a frame, and each breadth of canvas is lapped over each other in any manner required." The breadths are brought in succession over a bed-plate, in which is arranged a row of punches. There is also a row of tubes by which rivets are guided from a hopper to the rivet holes. The rivets are fixed in position by a pair of dies, one fitted with holes, and the other with corresponding pegs. Further pressure is applied by means of rollers. The canvas after being treated is wound on to a drum. The mechanism by which these processes are to be effected is not described, and the apparatus which is figured in the drawing appears only to be intended for use in making boots and shoes.

[Printed, 1s. Drawing.]

A.D. 1859, March 15.—N° 651.

GALLOWAY, GEORGE BELL.—Steam vessels, &c.

The square sails of vessels are fixed "both at the top and bottom to the yards by means of hoops or rings to which the sail can be attached and freed from as required by a hoop or lashing connected with the sail. This appliance is to enable the men to work the sails from the vessel's deck

“ by suitable running gear attached to the peak and also to the top of the sail, and the sails may be also stowed to the mast by a suitable lashing rope working as a downhaul.”

For raising and lowering boats the falls pass under rollers at the ends of the boat, and thence to holes in the barrel of a winch, by winding on which the boat is raised. In lowering, a friction band or other brake is used. The ropes may be made “ partially of tempered wire.”

[Printed, 8d. Drawing.]

A.D. 1859, March 16.—N° 659.

PARKER, JAMES. — (*Provisional protection only.*) — Propelling ships, &c.

“ Direct-acting lever sails ” are used. These are “ sails placed upon arms attached to a central shaft, similar to the arms of an ordinary water wheel, so that the portion of the sails exposed to the wind (when the vessel is sailing in the wind’s eye) recede directly from the wind, the other portion of the sails being protected from the wind by a “ curved screen.” Power thus obtained is transmitted to a propeller.

[Printed, 4d. No Drawings.]

A.D. 1859, April 12.—N° 910.

CLARK, WILLIAM.—“ Safety block to be used for lowering ships’ boats.”

The block “ with its sheave or sheaves is constructed in the ordinary manner, but having attached or secured to the bottom or lower part thereof ” a “ tumbling hook,” which hook is to be “ formed distinct and separate from the stem or shank, with which it is eccentrically connected by means of a pin or pivot, the stem or shank being slotted in order that the back of the hook may pass through the same. A small metal plate is attached to the stem or shank, so as to move freely for the purpose of operating as a stop or pawl,” or “ ‘ ketch,’ to prevent the back of the hook from passing through the slotted portion of the stem.” The stop rests against a shoulder formed on one side of the shank, and is kept in position by a pin passed through a hole in the shank, which rests in a hollow in the end of the pin. “ By this latter arrangement,

“ which is called and known by nautical persons as a ‘ mousing,’
 “ the cords or chains which may be passed over the hook are
 “ prevented from being accidentally thrown or jerked over
 “ the bill of the hook.” These blocks are used as lower blocks
 to a boat’s tackles, and when the boat is near the water the
 safety pins are taken out, and as soon as it reaches the water
 and the weight is off the hooks, the stops are removed, so that
 the hook falls and releases the boat.

[Printed, 6d. Drawing.]

A.D. 1859, May 30.—N° 1337.

CLARK, WILLIAM.—(*A communication from Enoch Erastus Mulliner.*)—(*Provisional protection only.*)—Reefing sails.

With square sails, the sail is divided horizontally into two parts which are laced together. To the lower corners of the upper part reef tackles are secured, and these are carried to blocks on the lower yard. To shorten sail, the upper yard is lowered until the lower edge of the upper half of the sail reaches the lower yard, so that this upper part alone becomes the sail, the reef tackles practically becoming sheets. The lacing which secures the two parts of the sail is then let go, and the lower part furled to the mast.

A precisely similar arrangement is applied to fore-and-aft sails.

[Printed, 6d. Drawing.]

A.D. 1859, May 31.—N° 1342.

WOOD, EDWIN ARCHER, and ROGERS, MARTIN DADD.—(*Provisional protection only.*)—“Apparatus for raising and lowering boats.”

The boat is hung “ in rope slings, which are rove through
 “ blocks in the bilges of the boat at the bow and stern, and
 “ are wound round an octagonal barrel mounted in the centre
 “ of the boat ; the ends of the rope slings being first passed
 “ through holes in the barrel, but not otherwise attached
 “ thereto. These slings are connected to the ordinary tackle
 “ of the davits.” The “ barrel is prevented from turning and
 “ unwinding the slings by means of a rope, stopper, or break
 “ and side pawl. The pawl must, however, be thrown out of
 “ action when the operation of raising or lowering is about to
 “ commence. The brake-rope is rove round the centre of the

“ barrel, and one end affixed to a staple in the bottom of the
“ boat, and the other lapped round a pintle or holdfast, and
“ held in the hand of the brakesman. When the boat has
“ been lowered to within a given distance of the water, the
“ back rope is slackened, and the barrel turning will allow
“ the slings to unreeve and disengage themselves from the
“ barrel, thereby leaving the boat free of the ship. For re-
“ hoisting, the boat must be provided with spare slings, which
“ are to be rove through the blocks and on to the barrel, and
“ connected with the davit-tackles, as before explained.”

[Printed, 4d. No Drawings.]

A.D. 1859, June 29.—N^o 1542.

NASH, JAMES.—“ An improvement in the form and in the
“ method of holding and releasing the tumbling hook of dis-
“ engaging blocks.”

“ This invention consists of an improvement upon the
“ disengaging blocks heretofore in use, and more particularly
“ the ‘ safety block ’ ” described in the Specification of Clark’s
Patent, No. 910, A.D. 1859.

“ The first part of this improvement consists in giving a
“ novel form to the tumbling-hook, the bill of the hook being
“ crescent-shaped, so as to be self-mousing, while the back of
“ the hook, acting in combination with a vertical sliding bolt
“ herein-after described, is self-fastening.”

The second part of the invention relates to “ an improved
“ method of holding and releasing the before-named tumbling
“ hook.” In No. 910, A.D. 1859, “ the method of holding
“ the tumbling-hook is described and shown to consist of a
“ small metal plate moving laterally on a pivot attached to
“ the stem of the block, this plate (which is called a stop or
“ ketch) resting against a shoulder on one side of the stem,
“ and is kept firmly in position by a safety pin passed through
“ a hole in the stem ; this safety pin is made sufficiently long
“ to meet the bill of the hook and form a mousing, which
“ prevents the cord or chain suspended from the hook from
“ being accidentally jerked off.”

In lieu of the metal plate or ketch moving laterally on a
pivot, the patentee employs “ a bolt sliding vertically on the
“ stem of the block, which is out of the way, and not liable

“ to be accidentally struck up, and therefore does not require
 “ a safety pin to secure it. From the novel and peculiar
 “ form given to the back of the tumbling-hook, when return-
 “ ing to its holding position it raises the vertical sliding bolt,
 “ which falls again by its own weight and becomes self-
 “ fastening. On lifting the sliding bolt by means of a chain
 “ or lanyard, the tumbling-hook is free to turn over in the
 “ usual manner, discharging whatever may have been sus-
 “ pended from it.” These blocks may be used for lowering
 boats.

[Printed, 6d. Drawing.]

A.D. 1859, July 1.—N^o 1572.

WOOD, EDWIN ARCHER, and ROGERS, MARTIN DADD.—
 “ Raising and lowering boats.”

The boat is suspended by metallic slings from the tackle blocks of the davits. Links on the ends of these slings drop into sockets in the knees close under the thwarts, one on each side of the boat. In the middle of the boat is a transverse rock-shaft with crank plates at its ends, to each of which is fixed a bar ending in a bolt which takes into one of the links on the slings. These bars slide in guides on the side of the boat. The rock-shaft is actuated by a curved handle fixed thereto, by means of which the bolts can be withdrawn from the links and the boat set free from the slings. To retain the bolts in the links, the handle is secured at the bottom of the boat by a pin passing through lugs fixed thereto.

Rope slings may be used, and these are passed “through
 “ blocks in the bilges of the boat at the bow and stem,” and then wound on a barrel at the centre of the boat. This barrel is prevented from revolving by any suitable means, which can be thrown out of action to release the rope.

[Printed, 10d. Drawing.]

A.D. 1859, August 4.—N^o 1800.

CORDNER, EDWARD JAMES.—Kites for life-saving apparatus.

The invention relates to the use of kites for towing ashore a boat from a stranded vessel. A series of kites of increasing size is employed, each kite being attached to the line of the *one before it*. It is also stated that the invention is applicable

to, "the propulsion of vessels in conjunction with sails or steam."

[Printed, 4d. No Drawings.]

A.D. 1859, August 13.—N° 1875.

LAMBERT, HENRY THOMAS. — (*A communication from George Hall Carleton.*)—"Apparatus to be adapted to ships' tackle or boats for the purpose of facilitating the disengaging of ships' boats when lowered into the water."

This invention consists of "a hook or contrivance which is, by preference, to be attached to the boat in some convenient part where it can be easily got at, so as to attach or detach the tackle therefrom with facility. The contrivance is a hook or staple open on the under side so as to receive a ring or link whereby the boat will be suspended. When the boat on being lowered reaches the water, the tackle will be slackened, and the ring or link will drop out of the hook and will be thereby disengaged from the boat without any assistance from any person in the boat. When it is desired to raise the boat out of the water, the ring of the tackle may be passed under the hook with almost equal facility, and will be prevented from becoming accidentally detached by means of a hinged piece which will close the mouth of the hook, and will be retained in its place by means of a pin, which is attached by a chain to some convenient part of the boat, and must be removed from the hook when the boat is to be lowered, so that the ring or hook of the tackle may be disengaged."

[Printed, 6d. Drawing.]

A.D. 1859, October 5.—N° 2268.

TURPIE, JAMES.—"Fore and aft gaff and boom sails."

The invention relates to a means of reefing such sails. The sail is bent to a spar "called a trysail mast, placed immediately behind the fore, main, or mizen mast, as the case may be," and this mast is so arranged that "it may be turned round in order to wind up the sail upon it; this is conveniently done by means of a winch handle giving motion to a screw which gears with a screw wheel fixed on the lower end of the trysail mast; the sail is arranged to slide

“ on the gaff and on the boom (if a boom be employed) in the ordinary manner; but the head of the gaff is not peaked up or raised as much as is usual, but is nearly parallel with the boom.”

[Printed, 10d. Drawing.]

A.D. 1859, October 21.—N° 2411.

PRIDEAUX, THOMAS SYMES.—Ships and rafts.

Various improvements in the construction of the above are described. Amongst them is the use of “corrugated iron or steel tubes” for making masts and spars. The iron may be corrugated first and afterwards bent into shape and rivetted, or the tubes may be corrugated after being formed by being pressed on a mandril. The corrugations “taper to correspond with the taper of the mast.” To enable the masts to be sent overboard in case of need the foot is formed of wrought-iron plate, resting on a similar plate above the deck. Both plates are formed with a flange; at one side they are hinged together, and at the other held together by a clip. On turning back the clip the mast can be lowered down, and by taking the pin out of the hinge it can be started altogether.

[Printed, 1s. 6d. Drawings.]

A.D. 1859, December 23.—N° 2930.

GUTHRIE, ROBERT DALRYMPLE.—“Lowering ships’ boats.”

The end of a pendant is made fast near the bows, and the end of another near the stern. These ropes are then led through blocks on the davits and made fast either in the boat or in the ship, according as the lowering is to take place from the boat or the ship. These blocks, &c., are all additional to the ordinary lowering tackle.

To lower the boat the ordinary tackle is unhooked, two or three turns are taken with the pendants round a spar (in the boat or on board ship), and the boat lowered to the water, when the pendants are let go.

[Printed, 6d. Drawing.]

A.D. 1859, December 30.—N° 2986.

JONES, REUBEN, and STOTHARD, DANIEL.—(*Provisional protection only.*)—“Raising, lowering, and disengaging ships’ boats.”

The improvements consist, “first, of an improved construction of block for raising and lowering ponderous bodies ; and, secondly, of improved mechanism, either separate from, or it may be used in combination with, the aforesaid blocks” for raising, lowering, and disengaging ships’ boats. The block consists of three pulleys “two of which revolve on fixed axes, and the other and intermediate pulley has its axis fixed in the pulley, and each axis fits into curved slots formed in the side plates of the block, so as to be capable of moving up and down the same.” “In proportion to the amount of weight attached to one end of the rope, in like proportion will be the pressure upon the aforesaid moveable pulley, thereby squeezing or wedging the rope between the two aforesaid pulleys, and thus producing the same effect as would be produced by passing a rope round a cleat in lowering weights, as commonly practised.” These blocks may be employed for lowering ship’s boats ; under the middle thwart of the boat are affixed two uprights, across which are pins, on which are hooks and catch levers, “the outer ends whereof pass in opposite directions. The ends of said catch levers are connected together by a rope or chain, which passes loosely over the top of the ‘thwart.’ A single rope passes from each of the aforesaid blocks over a broad pulley fixed at the stem and stern of the boat, and to the end of each rope a link of iron is fastened, so that when such links are each passed over their respective hooks aforesaid, and the boat raised from above, the boat cannot by any means become disengaged from the ‘davits’ until she reaches the water, when, by pulling the rope which is across the middle ‘thwart’ as aforesaid, the hooks will be disengaged, and the ropes will pass under the pulleys at the head and stern of the boat.”

[Printed, 4d. No Drawings.]

1860.

A.D. 1860, January 2.—N° 3.

SIMONS, WILLIAM.—Ship-building.

Amongst other improvements, a method of making iron masts is described. These may be formed of iron plates.

coiled helically into a tube, with their edges "close seamed" "and rivetted together." A single thickness of plating may be used, or there may be "two sets of narrow plates or bars, which may be of various sections" "crossing each other diagonally, spaces being left between them." In this case of course the coils of the two spires are in opposite directions. The two sets of plates are rivetted together. Supports may be fixed inside the tube to strengthen the mast.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, January 23.—N° 169.

FINLAY, ROBERT FREDERICK.—"Reefing and furling the sails of ships."

For reefing courses, the clew garnets are rove "forward of the sail, a tackle being hooked on to a cringle in the foot of the sail and secured to the deck, the clews are then to be hauled up and the sail reduced one half, standing in the form of a triangle."

For reefing top-gallant-sails and royals, a rope is fixed to the mast-head and passes "through a lizard in the bunt of the yard, thence to the head cringle of the sail, the same being then reversed." The sail is fixed to rings which run on the yard. To prevent friction, a pair of metal rods are let into the yard. The lowering of the yard causes the self-adjusting "in-haul and out-haul to act and run the sail in and out." "Upper and lower spilling lines go through cringles on the leech, passing through a lizard in the centre of the sail," and these "brail the sail close into the doublings of the mast."

For reefing top-sails, only one yard is used, which is revolved by the lifts. There is an iron rod "on the upper part of the yard" for the studding sail booms. A lift is secured at each yard arm which is "let into a groove or worm, in which" there is "an iron traveller with a leading block through which" the lift is rove. "When the lift is wound round the worm with a sufficient number of turns to revolve the yard, it is rove through a swivel block at topmast head" and thence led below. "The yard revolves of its own accord, and reefs the sail as it descends." "From shoulder to shoulder of the yard, the iron rod, which is fixed sufficiently high to allow the sail to roll round the yard, is secured to the iron for booms, to give strength to the iron rod it can be fixed by a

“ collar to the mast ” or otherwise. “ An upper topsail can be formed out of the top gallant and royal sails, and this sail can be reefed in the same way.” “ The parral of the yard is of the ordinary description, but the swivel or tub at the slings ” “ allows the yard to revolve. The top-sail is slit down the centre to pass the slings. “ A bonnet for the head may be dispensed with,” but when a band is used, “ wood or metal travellers pass up and down the edges of the opening on a bolt rope.” In case of the worm on the yard getting out of order, there is “ from the tub on the yard “ a short chain or bar with swivelled block to lead ” the lifts.

[Printed, 4d. No Drawings.]

A.D. 1860, February 17.—N° 440.

CUNNINGHAM, HENRY DUNCAN PRESTON.—Reefing sails.

When a rotating yard is used, on which the sail is wound to be reefed (as described in No. 13,368, A.D. 1850, &c.) the sockets on the parral in which the chafing spars fit are so arranged that the yard can be disconnected from the parral without disturbing the spars, or the spars without disturbing the yard. The drawing shows the spars fitted in standards on the yard-arms; and in sockets carried by the collar surrounding the wheel on which the reefing chain works.

This chain wheel or boss is made with teeth sufficiently wide apart for three links of the chain to fit between every two teeth, and the spaces between the teeth are made flat. The drawing shows a boss in which one half is fitted with teeth of the ordinary sort, and the other half with teeth arranged as above described.

This boss may be made in two parts, divided either “vertically or segmentally.” The drawing shows a boss divided by a plane at right angles to its axis. Plates are fixed on the yard, having on them a ridge and over and abutting against this ridge the two halves of the boss are fitted. They are fastened together by bolts, &c. and the ridge between the two parts prevents their slipping.

When a rotating yard is not employed, the improvements are “intended to assist the hauling” “out of the reef ear- ing” by the use of “levers at suitable places” “capable of

“ being worked from or on the top or on deck.” “ The ear-rings can be secured by a mechanical arrangement so as to make the operation as much as possible self-acting.”

[Printed, 8d. Drawing.]

A.D. 1860, February 29.—N° 552.

LYNCH, PATRICK FRANCIS, and TYNAN, JOHN.—(*Provisional protection only.*)—Boats, &c.

The inventors describe various improvements in boats which can be taken to pieces for portability. “ The stem and stern posts have apertures therein or affixed thereto, through which are passed the lowering tackle hooks, and are made sufficiently heavy or have weights attached to keep her taught when lowered into the water.” Also, the inventors say, “ any of the present arrangement of rigging can be used, but when a fore and aft sail is only required we arrange pendants from the fore stay, so that the sail can be close brailed up at once.”

[Printed, 4d. No Drawings.]

A.D. 1860, April 16.—N° 955.

NEWTON, WILLIAM EDWARD. — (*A communication from William Henry Allen and Andrew Jackson Bentley.*)—“ Nippers for attaching blocks and tackles to ropes.”

Two levers are jointed together like a pair of scissors. Their shorter arms are bent at right angles, and formed at their ends to a shape to fit a rope. These ends may be cast from a mould made from the rope itself, so that they fit it exactly. Rings are attached to the longer arms, and through them a rope is passed, so that while a strain is kept on the rope, the ends of the arms are kept together, and the rope held tight. To this rope a block, &c., may be hooked.

[Printed, 6d. Drawing.]

A.D. 1860, April 18.—N° 975.

PAYNE, HENRY.—(*Provisional protection only.*)—“ Lower-ing ships' boats.”

The inventor proposes “ bolting or otherwise securing at each end of the bottom of the boat a strong metallic block, having a slot or opening made across its centre, and a hole

“ formed through the metal in a contrary direction ; into each
 “ of the holes formed in the blocks is passed one end of a rod,
 “ the other end terminating in a double lever in or near the
 “ centre of the boat, each end of this lever being connected to
 “ one end of each of the rods. A vertical shaft passes through
 “ one of the thwarts of the boat and through the centre of the
 “ lever, a handle is placed on the top of the shaft which
 “ actuates the lever and pushes the rods forward or draws
 “ them out of the holes as required.” There are “ three guys
 “ at each end of the boat, one in the centre and one at each
 “ side, each of which have a flat link at their end ; said links
 “ are placed into the slot or opening formed in the blocks,
 “ and the ends of the rods pass through them, by which means
 “ the boat is suspended. It will appear evident that the boat
 “ cannot be disengaged from the guys until the rods are
 “ withdrawn by the action of the handle upon the lever, con-
 “ sequently no accident can happen by capsizing when struck
 “ by a wave or otherwise.”

[Printed, 4d. No Drawings.]

A.D. 1860, April 24.—N^o 1026.

FULLER, JOHN WALLACE.—(*Provisional protection only.*)—

“ Fitting dead-eye chain and preventer plates to ships.”

The inventor gives the following as the whole description :—

“ The object of my invention is to free the ship of all that
 “ part of the rigging connected with the dead-eyes themselves
 “ when a mast is carried away or is cut away at sea, and to
 “ prevent the same fouling of the ship’s propeller if provided
 “ with one. My invention consists in forming the ‘ preventer
 “ ‘ plates ’ which are secured to the ship’s side with a hook
 “ and with a toe for receiving the lower end of the chain plate
 “ to which the dead eye is attached. The bottom of this plate
 “ is formed to fit into the shoe in the preventer plate, and has
 “ a slot cut to fit the hook in the said plate. As long as there
 “ is any upward strain upon the dead-eyes, the chain plates
 “ remain firm, but should the ‘ channel rail ’ break or be cut
 “ away, then the dead-eyes fall outwards and the chain plates
 “ become at once unhooked and detached from the preventer
 “ plates and fall clear of the ship.”

[Printed, 4d. No Drawings.]

A.D. 1860, May 23.—N° 1282.

DE BOUSSOIS, FRANÇOIS JOSEPH EDOUARD DUCLOS.—
(*Provisional protection only.*)—Tubes, masts, &c.

The following is the entire Specification :—

“ This invention relates to an improved system or mode of
“ manufacturing tubular metal articles, such, for example, as
“ hollow axles, shafts, gun barrels and masts, and consists
“ essentially in the substitution of cast steel for wrought iron
“ in such manufacture. In making a hollow axle or tube
“ according to this invention, it is proposed to prepare a block
“ of cast steel of an annular form, the weight and dimensions
“ of which are proportioned to the weight and dimensions of
“ the hollow cast steel axle or other article to be produced.
“ This cast-steel ring having been heated to a welding heat,
“ is placed on a mandril, and rolled thereon between a pair of
“ rolls according to the manner described in the Specifications
“ of Mr. James Edward McConnell’s Letters Patent, of the
“ 28th August, 1851, No. 13,729, and the 24th June 1852,
“ No. 14,182.”

[Printed, 4d. No Drawings.]

A.D. 1860, July 10.—N° 1656.

JORDESON, THOMAS POWDITCH.—Life-boats.

A “ tubular ” life-boat, covered in at top, is described, and
it is stated that “ the mast and sails are made and arranged so
“ as to admit of their being hoisted by one rope.” In the
drawing the boat is represented with two sails like those of a
schooner, and a jib, and it is stated in the explanation attached
that the masts are pivotted and connected above by a rod so
that they may both be raised by hauling on the forestay.
The sails appear to be set in the usual manner.

[Printed, 6d. Drawing.]

A.D. 1860, July 17.—N° 1725.

HENSON, JAMES, and HENSON, WILLIAM FREDERICK.—

“ Manufacturing canvas and other fabrics for tarpaulings,
“ sacks, rick-cloths, ship sails, and for other purposes; and
“ also for uniting the edges of the same,” &c.

The inventors say :—“ We give to canvas and other fabrics
“ or materials, either woven or otherwise, manufactured of

“ cotton, linen, wool, flax, silk, or other materials, or any combination thereof, durability and increase of strength, by manufacturing them into squares or other suitable forms, whereby a bend, ridge, or flat surface is raised upon the surface of such materials when manufactured.

“ We also unite the ends of the fabrics or materials by lapping or fishing them with a solution of caoutchouc or gutta percha, or either or both the said substances in combination with shellac or other suitable substance, such as marine glue, either alone or in combination with any of the before-mentioned substances. After having applied the solution to the edges of the fabric or material, we pass the same through or between suitable rollers for the purpose of uniting them and making a seam or joint of great strength and durability, thus rendering the present mode of sewing quite unnecessary. If found desirable, the edges or joints may be fished and sewn, and the solution added.”

[Printed, 4d. No Drawings.]

A.D. 1860, August 3.—N^o 1888.

THOMPSON, EPHRAIM UPHAM.—“ Apparatus to be applied to a shroud, stay, or other portion of the rigging of a navigable vessel, in order to enable the setting or tightening thereof to be effected and maintained.”

“ There is attached to the shroud chains of the vessel (or other point to which rigging is to be fixed) by a pin passing through suitable eyes, or otherwise, a metal bar which is forked at its further end. To the end of shroud, stay or other rope to be made fast, a metal thimble is fitted; this thimble has two lugs formed on it externally, and by suitable shackles these lugs are connected to one end of a metal bar, which is made of a wedge form, the thinner end of the bar being that which is shackled to the thimble above mentioned. The shroud or rope is made fast by placing the wedge-shaped bar between the prongs of the forked bar, and slipping retaining rings over the said prongs, so as to close them upon the wedge-shaped bar.

“ In order to set up the shrouds or other portions of the rigging, an apparatus is employed, consisting of hook or claw suitably formed to embrace the end of the forked bar, where it is connected with the shroud chain or other point.

“ into the stem of this hook or claw a screw enters, there being
 “ a hole or passage formed in the stem of the hook or claw to
 “ receive the screw ; a similar claw is also employed to em-
 “ brace and hold the end of the wedge-shaped bar which is
 “ shackled to the shroud or rope, and this claw is pin-jointed
 “ to a bar, which also at its other end receives a screw ; this
 “ latter screw is made in one piece with the screw before
 “ mentioned, but the thread is cut in the opposite direction.
 “ It will be seen that by turning the screws above mentioned
 “ by means of a suitable head formed on them, the two claws
 “ will be drawn closer together and the rigging thus set up ;
 “ it is afterwards made fast by driving the retaining rings
 “ further down on the forked bar as before mentioned. The
 “ bar to which the upper hook or claw of the setting up
 “ apparatus is jointed, has several holes formed in it, so that
 “ the hoops or claws may be set at different distances apart,
 “ as may be required.”

[Printed, 8d. Drawing.]

A.D. 1860, September 10.—N° 2187.

TURPIE, THOMAS.—Furling sails.

The clue lines “ are brought to the front of the sail.
 “ The yard and the sail are hoisted by the ordinary halliard,
 “ which is attached to ” “ a sling fixed above the yard, and
 “ such sling has two blocks for the passage of the clue lines in
 “ their way from the clues of the sail down to the deck, and
 “ an eye or fair leader for the buntline. The clue lines in
 “ passing from the clues of the sail are conducted through
 “ eyes ” to the sling. These eyes “ are fastened to bands
 “ which are fixed to the sails in curved lines proceeding from
 “ about the centre of the head of the sail in a direction to the
 “ outer edges or leach ropes of the sail, the curves being
 “ struck from the earrings or outer ends of the head of the
 “ sail till the curved lines reach the leach ropes on each side
 “ of the sail, and then the clue lines are conducted down the
 “ leach rope to the clues through eyes.” The eyes are
 “ preferred of metal, and flat at one side, “ so that they may
 “ be sewed direct to the bands.” The bunt-line is passed
 “ down “ from the fair leaders affixed to the sling in front of the
 “ sail as heretofore, but in place of the two legs or forked end
 “ of the buntline being fastened to the foot of the sail near the

“ centre, the legs or forked ends are lengthened, and they are
 “ passed through eyes ” “ fixed to the foot of the rope, and
 “ the ends of the legs are made fast to the clues. In order to
 “ gather up the slack at the central part at the foot of the sail,
 “ what may be called an after leg to the buntline is employed,
 “ which is fixed to and passes from the buntline through an
 “ eye or hole in the sail, and such after leg at its lower end
 “ has two or more branches, which are fastened, which serve
 “ to furl up closely the centre of the sail, which would other-
 “ wise be slack.” In fitting courses, leach lines are employed
 which “ work in arcs or curves in the same manner as the clue
 “ lines. The arcs in which they work are concentric with the
 “ arcs for the clue lines, and of about one-half the radius.”
 They, as well as the clue lines are in front of the sail.

[Printed, *ed.* Drawing.]

A.D. 1860, September 15.—N° 2249.

BARNWELL, STEPHEN, and ROLLASON, ALEXANDER.—
 Combinations of pyroxylene.

The invention consists in dissolving pyroxylene in any of its
 solvents and adding oil thereto. Gum may also be added and
 colouring matter if required.

The pyroxylene is produced by steeping rags in nitric or
 sulphuric acid and drawing off the acid after twenty-four hours
 immersion. The acid is boiled and brought up to the required
 strength by the addition of fresh acid, and it may then be used
 again. Also “ fibrous and other matters containing cellulose ”
 may be exposed to the action of mixed acids of such strength
 and temperature that they will be converted into a sort of
 “ half-stuff ”

Very numerous applications of the substance, both solid and
 in solution, are given. Amongst them it is stated that it
 may be applied to sails, presumably as a dressing or for
 waterproofing.

[Printed, *ed.* No Drawings.]

A.D. 1860, September 20.—N° 2289.

TAYLOR, JOHN HENRY.—“ Lowering ships’ boats and
 “ disengaging same from the tackles.”

“ To the middle thwart of a ships’ boat, and resting thereon
 “ by a hinge,” is fitted “ a lever which passes through the eye

“ of a long bolt extending downwards through the support of
 “ the thwart into a hole ; this bolt takes into or passes through
 “ two rings or two eyes fastened on two separate chains, one
 “ leading to the forward part of the boat and the other aft
 “ through suitable guides ; the other end of each of the afore-
 “ said chains has a bent pin or staple connected thereto, over
 “ which is passed the looped end of two ropes, one leading by
 “ a pulley through a hole in the forward thwart, and the other
 “ rope through a hole in the after thwart ; the ends of each of
 “ the aforesaid bent pins is passed into a hole in a shock fixed
 “ to the boat's bottom, so that supposing the boat to be slung
 “ from a ship's davits by the fore and aft ropes in the manner
 “ above mentioned, and to be lowered therefrom by pulling
 “ the bolt in the middle thwart by means of the lever,” the
 chains will be released and the bent pins drawn out by the
 weight of the boat coming on them, so that the rings are free
 to slide off the hooks and the boat is disengaged.

[Printed, 10d. Drawing.]

A. D. 1860, November 2.—N° 2680.

DAVIDSON, HENRY, and ELLERCAMP, JAMES McDONALD,
 —(*Provisional protection only.*)—“ Lowering and disengaging
 “ ships' boats from their tackles.”

“ At each side of a ships' boat, and at those parts where the
 “ fore and aft thwarts are situated, metal eyes are fixed to the
 “ gunwale, two at each side of the boat ;” to these eyes are
 affixed slings “ lengthwise of the boat,” which are connected
 together by a ring, passing over a hook “ connected with or
 “ affixed to the lowermost block of the raising and lowering
 “ tackle from the davits.” By these means the boat is sus-
 pended from one point instead of two.

“ One form of hook consists in dividing the bottom part of
 “ same crosswise, and then connecting one of such parts by a
 “ pin serving as a hinge, said pin or joint being slightly on
 “ one side of the centre line of the hook ; the upper end of the
 “ moveable portion of the said hook has a hole formed therein,
 “ which, when the hook is closed, fits over a spring pin or bolt
 “ inserted in the upper fixed portion of the hook, so that
 “ supposing a boat or other weight to be suspended by such a
 “ hook, in order to disengage the weight therefrom the spring
 “ pin aforesaid has to be pulled back, by which the moveable

“ part of the hook will be disengaged from the fixed part thereof, and the gravity of the weight will cause such moveable part to fall, and thus disengage the weight therefrom.

“ Another form of construction of hook consists in connecting the aforesaid moveable part of the hook to the fixed part thereof by a pin so placed as to enable the moveable part of the hook to move sideways, or at right angles to the fixed part of the hook.”

[Printed, 4d. No Drawings.]

A.D. 1860, December 12.—N° 3049.

SCOTT, JOHN.—(*Provisional protection only.*)—“Reefing and furling sails.”

The following is the whole Specification :—

“ My invention applies to fore and aft as well as to square sails, and consists in causing the sail to be reefed or furled from the foot upwards by being rolled upon a spar or roller provided with sheaves at the ends. Reef lines are carried from the deck over pulleys or through blocks on the yard, and are made fast to the sheaves. By hauling on the reef lines the spar is made to rotate, and the foot of the sail is rolled up thereon; by continuing to haul the sail may be reefed to the extent required or completely furled. The spar is held in hoops or rings connected to the topsail sheets.”

[Printed, 4d. No Drawings.]

A.D. 1860, December 21.—N° 3139.

MOORE, THOMAS.—“Navigating ships.”

One part of the improvements relates to reefing sails by a roller.

The yard is suspended by “lifts and tye attached to three swivels of the common kind called ‘tubs.’” “The yard-arm swivel receives the lift, and the centre or sling band swivel the tye.” Round the centre sling barrel ropes or chains are passed which rotate the yard. These chains may have their ends carried below, or they can be fixed to the barrel, and be wound on it a sufficient number of times for the yard to revolve by its own weight, or each chain “can be made an endless one” by passing the “chain” through a

sheave on the mast head, then taking it round the barrel, and below to another sheave where the ends unite. By letting go this chain the chain round the barrel slackens, and the yard is allowed to drop. To taughten the leach of the sail a pall and ratchet wheel are fixed on the yard, so as to prevent it revolving when required. Various slight modifications in the method of revolving the yard may be made.

Down the middle of the sail is an opening, covered by a "lappet." "This lappet has thimbles along its edge, through which a line is passed from head to foot. As the yard revolves the lappet falls and vicé versâ." "The lappet laces at the foot so as to admit of being taken off at sea without unbending the sail. An improved traveller in two parts, one-half of which is fastened to the lappet, and the other half lashes or screws to it, closes up the aperture in the sail by travelling up and down a bolt rope on the edge of the sail. The braces are secured to the sling bands at yardarms. The sheets lead through sheaves. From these bands a downhaul is bent to the sling band. The booms are let on to the parall, and can be fixed above or abaft the yards." "The booms when abaft the yard from a defence against friction to the sail by the topmast stays and rigging."

[Printed, 10d. Drawing.]

1861.

A.D. 1861, January 1.—N^o 5.

CAMPBELL, PETER, and KENDAL, THOMAS ALFRED.—
Sails, &c.

"This invention has for its object improvements in sails and apparatus used therewith. For these purposes, in order to facilitate the reefing of the sails of ships and other vessels, they and the apparatus used therewith are constructed and arranged in the following manner:—In applying the invention to a topsail, or to a similar sail, the sail is by preference furnished with three yards, an upper, a lower, and a middle yard." "The portion of the sail between the middle and upper yards is that which is taken in by the reefs, of which *there are two*; the first takes in the upper part of this

“ portion of the sail, and the second reef the remainder thereof
 “ down to the middle yard. Across the sail at the line down to
 “ which the first reef is desired to extend, a strong wire or other
 “ rope is fixed, to which at distances apart the ends of a number
 “ of cords or brails are fixed, these cords or brails are passed
 “ over or under the top yard, and then descend, the other
 “ ends of the cords or brails being all brought together, and
 “ made fast to a rope which descends to the deck, the rope
 “ being passed through a suitable block or blocks. Where
 “ the cords or brails come in contact with the sail both at the
 “ front and back thereof, it is preferred to attach bands to the
 “ sail to prevent it chafing, and to fix rings or fair leaders on
 “ those bands for guiding the cords or brails. A similar
 “ system of reefing may be employed where only an upper
 “ and lower yard are employed in cases where it is desired to
 “ make but one reef.”

In applying the invention to the sails of fore-and-aft rigged vessels, “the sails are similarly constructed and worked to
 “ what has been above described, provision being made for
 “ the differences of the shapes of the sails, and the differences
 “ of the spars which carry them.”

[Printed, 1s. Drawing.]

A.D. 1861, January 19.—N^o 151.

VANDERCRUYCE, HENRY.—“Striking the masts of ships
 “ at sea with sails and courses set.”

The cap of the lower mast “should rise sufficiently above
 “ the top to receive the sling of the lower topsail yard, and a
 “ provisional sling for the yard above it.” In the cap is a
 block. “Two moveable iron arms to support the front of the
 “ tressel trees when brought down” “start from a circle of
 “ iron on the cap, and go to the front of the chest or case
 “ of the topmast, where they will be held by chains” from
 he block on the cap. “These arms will be united by a cross-
 “ piece, on which will be the standing part of the top rope.”
 There are also on the lower mast “two moveable arms or
 “ brackets held upwards by a chain” from a ring round the
 mast. The tressle-trees “receive an elongated oval piece, and
 “ close in front with a hinged crosspiece.” On the tressle-
 trees “cleats will be pinned, so as to retain the key of the

"topmast" that its foot may not press upon the hinged piece. On the oval piece are "moveable bars" which "have a rigging" "consisting of the cross preventers or backstays of the topmast and a cramp in shape of a goose foot, the back standing part of which will fasten to a cleat" "at the back of the lower shrouds," "and the front will stop a double tackle block, the lower pulley of which" is hooked "in front of the lower shrouds," while the fall is made fast below. The backstays of the top-gallant masts pass through blocks in the ends of the moveable bars "to stop a single tackle pulley, the tackle of which will come plumb with the top-gallant mast." "Within the rigging" a downhaul is fixed to "start at a suitable height" from the back-stays of the top-mast, pass through these moveable bars, and hook on to an upper pulley of the tackle of the backstays of the topgallant mast. At the back of the bars "is fixed" "a staple ring to receive a haul" which "will pass thence through a block on the backstay of the topmast to the deck." On the oval piece are rings for "the shrouds staying the lower mast." From the head of the top-mast "the ladder or shrouds," start and these end "in two staple rings at the back of the tressle-trees." "At a suitable part of this ladder" is placed "a screw jack descending to the deck." "Two small moveable arms" project from this ladder, and support its lower extremity when the mast is struck, and by working the screw jack the topmast ladder will treble on itself, and fall along the lower mast." The royal-masts "generally have triangular sails."

"Only four lower shrouds need be used, one to stay, one for backstay of the topmast, and one for the topgallant mast. Each of these latter standing parts will have a traveller spliced on to it at a suitable height, and will be tightened by a screw. This screw will have at its head a strong hook, which when the mast is struck will serve to hook on to the traveller" "to again haul taut the mast. The stay of the topmast may be fitted in the same manner." "The stay of the fore topmast will pass through a dead eye stopp'd on to the bowsprit, and thence round the main jib boom to a screw fixed on the fore part of the vessel. The stay of the main topgallant mast will pass through a fixed pulley on the cap of the foremast, and will stop a tackle pulley, the

“ fall of which will descend to the deck, and the lower pulley
 “ of which will be fixed to the lower-mast. The topmast may
 “ taper upwards until it forms both top and topgallant mast
 “ in one piece.”

[Printed, 1s. Drawing.]

A.D. 1861, January 23.—N° 183.

CLARK, WILLIAM.—(*A communication from Justin Louis Hyppolyte Eugène Bonnet.*)—(*Provisional protection only.*)
 —“Ships’ sails.”

The inventor thus describes his invention :—

“ I unite the widths of cloth in regular or irregular quadri-
 “ lateral figures according to the part of the sail to be formed,
 “ and I cut these quadrilateral figures into triangular pieces,
 “ or it may be into triangular and irregular four-sided figures,
 “ according to the position they are to occupy in the sail,
 “ which is effected without any waste of material, the
 “ triangular pieces being disposed with their angles con-
 “ verging to the point of strain or traction, and the several
 “ pieces when combined making up the area of the sail. The
 “ seams formed by the junctions of the angular pieces converge
 “ more or less (in square sails) towards the middle of the sail.
 “ Between the angular pieces I dispose parallelograms com-
 “ posed of widths of cloth, which in square sails converge
 “ towards the middle, one from each of the lower corners,
 “ and a third centrally from the top to the same point. As
 “ the sail stretches, these pieces can be readily removed in
 “ part or altogether, and simply cutting and splicing the
 “ binding ropes. I round the corners of square sails.” “The
 “ same method applies to forming mizen sails and jibs, but I
 “ make all the most acute angles of the pieces converge to an
 “ angle of the sail, and from which angle across the middle
 “ of the sail I introduce the parallel removable widths of cloth.
 “ In these cases I compose the sail entirely of angular pieces,
 “ produced as aforesaid, with the addition of the parallel
 “ reducing pieces.” “I carry the bolt ropes round, and
 “ afterwards attach the eyes or thimbles by separate strops to
 “ the sail, which prevents liability to rupture when the strain
 “ comes on the points of attachment, which system is
 “ applicable to all kinds of sails. The removal of the angles

“ of the sails also allows of establishing on the same spar
“ sails which would otherwise be too large.”

[Printed, 4d. No Drawings.]

A.D. 1861, January 24.—N° 193.

SELBY, GEORGE THOMAS—(*Provisional protection only.*)—
“ Masts and posts.”

The following is the whole Specification :—

“ My invention consists in constructing ship’s and other
“ masts, telegraph and other posts, of tubes of wrought iron
“ combined and united to form a light and strong structure.
“ As an instance, one form of combination suitable for a
“ telegraph post is composed of three wrought-iron tubes,
“ screwed into or otherwise fixed on a base of metal, wood, or
“ stone ; each of the tubes is made to incline inwards towards
“ the top, where they are united in a disc or ring of less
“ diameter than that of the base ; a stay may be added, if
“ required, to strengthen the compound post, at or about the
“ centre. Again, for a mast a central and larger tube may be
“ carried up from the base through the disc or ring, a number
“ of these parts or combinations may be joined together, the
“ tubes may be of a large diameter at the base, and may be
“ made gradually decreasing in diameter towards the top, or
“ they may be of the same diameter throughout.”

[Printed, 4d. No Drawings.]

A.D. 1861, February 14.—N° 380.

CUNNINGHAM, HENRY DUNCAN PRESTON.—*Sails and rig-
ging.*

Square sails are placed aft of the mast. The shrouds are
carried forward ; there are no fore-stays, but there are stays aft
of the mast and also an additional set a considerable distance
aft. The yards are divided or formed “in two halves or
“ pieces,” and “each half is secured at its inner end by a
“ moveable joint to the mast, and is capable of moving
“ in different directions.” “It is desirable to place the
“ points of connection of the yards to the mast as far from
“ the mast as possible, as it allows the yards to be trimmed at
“ a more acute angle with the keel.” “The axis of the yards”
can “be in common,” and the yards may be capable of being

connected so as to form a single yard. The sails haul in and out on the yards; they are fitted with brails and reef points. The joints may be fixed to parrals. Either half alone of the sail may be used as a fore-and-aft sail. The sails are not divided. The upper sails may be triangular, "stretched out" at the foot on each side of the mast."

[Printed, 1s. Drawings.]

A.D. 1861, March 25.—N° 748.

MORGAN, JOHN, JAY, ALFRED THOMAS, EDWARDS, EDMUND, and TILSTON, JOSEPH.—"Ropes or cables."

"This invention consists in the arrangement of a spiral coil of wire or ribbon" "composed of iron or other metal, within a covering of rope" "composed of vegetable fibre, metallic wires or metallic ribbons, in such a manner that the stretch of the rope longitudinally is prevented by the resistance of the internal coiled wire to a [transverse strain."

The cable is principally intended for telegraphic purposes, and in that case contains a central conducting wire properly insulated.

Without the conducting wire the rope may be used for ships, rigging, &c.

[Printed, 8d. Drawings.]

A.D. 1861, March 30.—N° 782.

SIMONS, WILLIAM.—(*Provisional protection only.*)—Ship-building.

The only part of the Specification connected with this series runs as follows :—

"Constructing of iron diagonal latticework yards, masts, or spars with long bars of T-iron or angle-iron alone or together, or in connection with flat bars and with internal horizontal transverse bars or bolts; or the spars may have throughout their length circular solid or perforated discs secured to the inside of the latticework. Similarly external hoops may be rivetted or otherwise secured to the outsides of such latticework yards, masts, or spars."

[Printed, 4d. No Drawings.]

A.D. 1861, April 11.—N° 887.

CHALMERS, DAVID. — (*Provisional protection only.*) —
 “Weaving textile fabrics.”

The improvements are mentioned as specially applicable to sail-cloths.

“Under one modification the cloth has woven in it at regular predetermined distances asunder transverse stripes or narrow widths, which are made much stronger than the intervening portions of the fabric. Thus, in weaving sail cloth, or other fabric,” “the mechanism of the loom is arranged so that at regular intervals where these stripes are to occur a change of the shuttle is made, and a certain predetermined number of shoots of weft of a much stouter quality is thrown in. After this the weaving with the ordinary weft goes on until the distance is accomplished for the stripe to occur again; in this way by the alternate use of the ordinary weft and of a heavier quality, the stripes are introduced at regular intervals, and by simple self-acting means for effecting the change of the shuttle boxes. Instead of transverse stripes of plain cloth of a heavier texture, the cloth may be twilled at regular intervals, and the weft beaten up to produce the required thickness or degree of strength. Or, instead of transverse stripes of stronger material, the stripes may be formed longitudinally, or a combination of stripes in both directions.”

[Printed, 4d. No Drawings.]

A.D. 1861, June 1.—N° 1373.

WATSON, GEORGE. — (*Provisional protection only.*) — “Dis-
 engaging apparatus for boats.”

The following is the entire Specification :—

“My invention consists in fitting in the bow and stern of boats a lever hook, by which the boat is suspended from the ordinary tackle used for hoisting and lowering boats; no additional tackle or ropes are required. I carry a bar or rod along the floor of the boat, and affix at each end of the bar a collar with a slot or portion cut away from the body of each collar. A pin connected with the lever hook enters each collar both at bow and stern, and as long as the pins are retained in the collars, the hooks are closed,

“ and the boat is connected to the suspending tackles ; but on
“ turning the rod by means of a handle connected to it for the
“ purpose, so as to bring the open parts of the collars
“ upwards, the pins become released, and the hooks open
“ simultaneously, and the boat is disengaged both at bow and
“ stern.”

[Printed, 4d. No Drawings.]

A.D. 1861, June 7.—N^o 1446.

BENNETT, SAMUEL.—(*Provisional protection only.*)—Utilising waste tubing.

The scrap resulting from the manufacture of tubing is heated to redness, and each piece slit and opened out. These pieces are heated and rolled, after which various articles, among which ships' thimbles are named, may be stamped out of them.

[Printed, 4d. No Drawings.]

A.D. 1861, June 7.—N^o 1454.

SANDS, WILLIAM AUGUSTUS.—Sails.

In making sails the edges of the cloths are run together. A rope is then attached along the seams “in the same manner
“ as is practised in securing a rope on the edge of the sail.”
“ Transverse and diagonal ropes are employed to give additional strength where required.” To reduce the sail, the corners are folded up by “drawing the clews up to the yard.”
“ For this purpose the sail is provided with two quarters sheets in addition to the usual sheets, the quarter sheets being attached to the foot of the sail at a distance from the corners or clews about equal to the height of the sail ; these quarter sheets pass through two blocks attached to a sling of the yard, and thence to the deck. Two clewlines are also employed, which pass diagonally across the back of the sail to and through blocks attached to the upper yard near the topmast, and from thence to the deck. Two other clewlines are also attached to the corners of the sail, so as to pass diagonally across the front of the sail, and through blocks attached to the sling of the yard and thence to the deck. The outer sheets are applied in the usual manner. A buntline is attached to the middle of the foot of the sail, and passing up the front thereof to and through a block attached to the sling, and from thence down to the deck.”

[Printed, 8d. Drawing.]

A.D. 1861, September 9.—N° 2246.

SIMONS, WILLIAM.—Ship-building.

The only part of the Specification connected with this series runs as follows :—

“Constructing of iron diagonal lattice-work yards, masts, or spars with long bars of T-iron or angle iron alone or together or in connection with flat bars, and with internal horizontal transverse bars or bolts; or the spars may have throughout their length circular, solid, or perforated discs secured to the inside of the lattice-work. Similarly external hoops may be rivetted or otherwise secured to the outsides of such lattice-work yards, masts, or spars.”

[Printed, 3s. 2d. Drawings.]

A.D. 1861, September 19.—N° 2343.

SILVER, THOMAS, and MOORE, THOMAS.—(*Provisional protection only.*)—Ship-building.

The only part of the invention connected with the present series “consists in abolishing all standing masts, yards, or rigging; spars to be carried to take fore and aft sails in an emergency, and to be hinged, falling along the roof of the upper or hurricane deck, to form seats.”

[Printed, 4d. No Drawings.]

A.D. 1861, September 24.—N° 2381.

GLADSTONE, GEORGE JOSEPH.—“Apparatus for disengaging boats.”

According to this invention “an axis turns in suitable bearings, by preference near the bottom of a boat, and the axis is of such a length as to reach nearly from end to end of the boat. At each end of the axis is a crank, to which is attached a connecting rod, which at its upper end has a hook or eye formed to receive the hook of the lowering tackle. The hook or eye at the end of each of the two connecting rods is formed to open on a hinge. The point of the hook when closed is parallel with the upper end of the connecting rod, and the hook or eye passes between guides or plates, which are only wide enough apart to allow the hook or eye to be received when the same is closed, hence the connecting rod and the point of the hook when at the

“ lowest position will be retained shut ; but when the axis is
“ turned partly round, by a handle or projecting arm thereon,
“ the upper end of each of the connecting rods will be raised
“ to such a height as to release the point of the hook, when
“ the boat’s tackle at both ends of the boat will be simulta-
“ neously released.”

[Printed, 10d. Drawing.]

A.D. 1861, October 5.—N° 2492.

COLLINS, JOHN SCOTT.—Reefing and furling sails.

The invention may be applied to square sails and fore-and-aft sails alike. At the ends of the yard, boom, &c. are placed chain wheels. Stretched between these wheels is a chain parcelled with coir, &c. to give it stiffness, or a spar, &c. To this the foot of the sail is fastened. Or the foot rope of the sail may be composed of a similar stiff chain. Round these chain-wheels chains are placed, so that the wheels may be made to revolve and roll the sail on the stiff chain.

An improved parral is described. It is to be used for the top-sail yard, in order to keep the yard close up to the mast. On the ring which slides on the mast (this ring is formed of wood secured by a jointed iron band) is a flange with a pin projecting vertically downwards. A similar flange with a hole for the pin is fixed to the sling band of the yard. Through both flanges are pierced corresponding holes for a pair of fixed guide ropes. As the yard is lifted to its place, these ropes guide the pin in one flange to the hole in the other, and the two are locked together.

[Printed, 10d. Drawing.]

A.D. 1861, October 28.—N° 2697.

WATSON, GEORGE WILLIAM.—(*Provisional protection only.*)

—“ Reefing fore and aft sails.”

“ The sail must be of the ordinary kind, the only difference
“ being that it is made to turn round a boom placed on the
“ ordinary boom, and turned by means of a wheel fixed to
“ the boom, which wheel will by no means interfere with the
“ arrangement of any of the running gear, and can be used at
“ any time, one or two men being sufficient for the purpose
“ of reefing, according to the strength of the wind and size of

“ the sail, and can be brought from a whole sail to a balance reef in the short space of five minutes under any circumstances, with the advantage of the sail when reefed still continuing nearly at the boom end, as in the old mode of reefing.”

“ This mode of reefing is accomplished without the aid of reef earings or reef points, and does not require brails or any other gear.”

“ In case of its being necessary to wear ship, the peak can be dropped, or the sail lowered down as usual.

“ The said invention is perfectly applicable to vessels of all descriptions, and can be used with brail and outhaul in the usual way.”

[Printed, 4d. No Drawings.]

A.D. 1861, October 30.—N^o 2720.

LEIGH, EVAN.—Sailing ships, &c.

A portion of the Provisional Specification runs as follows ;—

“ My invention consists, firstly, in the application to vessels of all classes of iron or other metallic masts flattened out above deck with iron or other metal plates, so as to present any required surface to the action of the wind, the said masts so constructed as to turn on pivots in foot steps, operated upon by a worm working in a sector wheel or other mechanical means, so as to present the broad surface or sharp edge of the mast at pleasure to the wind. In vessels or boats having more than one mast, I propose to run a longitudinal shaft under deck to connect them all together by worms and sectors, and operate upon them all at once by simply turning the shaft. The plates on the upper end of the masts I propose to attach so that the masts are exactly in the centre, by which (like the throttle valve of a steam engine) they will turn in equilibrium against any pressure of wind, and thereby dispense entirely with all the ordinary sails and rigging at present employed in ships.”

In the Final Specification the inventor describes a ship with two rows of masts. Over each mast a tube fits which works on a pivot at the top of the mast. From these tubes yards project on which are fixed sails of corrugated sheet iron, stiff canvas, or other material. The tubes may be worked separately or together by suitable gearing actuated by steam, or as

described in the Provisional Specification, or by a windmill. The masts may "work in foot stops" as described in the Provisional Specification, and carry the sails themselves.


[Printed, 1s. 4d. Drawings.]

A.D. 1861, November 2.—N° 2755.

WALKER, THOMAS. — (*Provisional protection only.*) —
"Cables and chains for telegraphic and other purposes."

The only parts relating to the present series are contained in the two following extracts :—

"My improvements consist in using pieces of iron or other metal pipes, and joining them together with certain joints so as to form a continuous chain of any desired length."

"In certain parts of my pipes I use joints in this form , being a collar turned in at one end. In case I should use wrought iron for this purpose, I claim the following machinery for the purpose of making them :—I use a mandril made into the form of the internal part of the collar, and a sunk die to fit the external part. A straight collar of iron being made hot, and placed on the mandril, and the die being brought close by any pressure will form the collar. These pipes can be used as part of the rigging of ships, to answer the purpose of ropes or claims."

[Printed, 4d. No Drawings.]

A.D. 1861, November 25.—N° 2956.

GOUDIE, JOHN.—(*Provisional protection only.*)—Reefing and stowing sails.

The inventor describes the improvements as applied to the main-top-sail of a ship, and says : "In or near the centre of the sail I propose to place longitudinally and parallel to the main and topsail yards a boom or extra yard. On each end of this boom I place a casing to protect and guide the operation of the rolling tackles and downhaul hereafter described. The rolling tackles passing through blocks or sheaves at the ends of the topsail yard descend to the ends of the boom before mentioned, round which they wind. The downhaul leads thence to blocks or sheaves at the ends of the main yard, thence to blocks attached to and under the centre of the topsail yard, from whence the downhaul descends to the deck, to be belayed in the usual manner."

"The operation of my Invention on the sail may be thus described :— Suppose the sail to be set and the rolling tackles hauled taut; it is desired to take in a reef," "the top-sail yard is lowered more or less as required for single, double, or close reefing; the downhaul is then hauled taut and belayed, and the reefing of the sail is complete. If the sail is to be stowed, I lower the yard in the usual manner, haul taut the downhaul and belay it; I then let go the sheets and haul on the rolling tackles, which rolls the sail on the boom close up to the yard, and the stowing is complete."

[Printed, 4d. No Drawings.]

A.D. 1861, December 2.—N° 3024.

RALSTON, GEBARD. — (*A communication from Jacob Snider, junior.*)—Preparation for preserving iron plates, &c.

Amorphose graphite is reduced to a fine powder, and freed from impurities. The powdered graphite is then mixed with oil in a mixer in the following manner :—"Slightly warm the mixer by a coil of pipe heated by steam, so that the powdered graphite shall not be allowed to cool and take up atmospheric moisture. Then put pure crude or raw linseed oil therein, in the proportion of one pound of oil to three pounds of the dry powdered graphite, and when these have been gradually mixed or combined in the 'mixer,' there must be added hot pure yellow beeswax in the proportion of about one pound of beeswax to every ten pounds of the powdered graphite, the whole must then be well and thoroughly incorporated together therein previous to being ground cold or at a suitable temperature in a paint mill, wherein it must be ground to a consistence equal to white lead ground in oil, to preserve it for readily combining with additional oil when needed for use." The composition may be applied "to iron, steel, or other metal plates for building ships or for casing ships outside or otherwise," "for preserving wooden ships, and preventing them from getting foul," and for preventing the oxidation of iron or metal bolts, or the decay of the wood in which they are driven. After the application of the graphite composition, a graphite paint is employed, made of the same material as the composition, except that the beeswax is omitted,

No application is mentioned of the material to any purpose connected with the present series, but reference is made to this Specification in No. 2461, A.D. 1862.

[Printed, 4d. No Drawings.]

A.D. 1861, December 16.—N° 3155.

CHALMERS, DAVID.—Weaving.

A peculiar description of loom is shewn with a special method of “actuating vertical shuttle boxes.” In the Provisional Specification it is stated that one part of the invention consists in “manufacturing a particular kind of sail cloth or canvas by “power” in a loom of this sort. In the Final, no reference appears to be made to this. “Duplex shuttles” are used, and two sorts of weft, one heavier than the other. “The sequence “of the duplex shuttles are so arranged that a certain number “of shots of weft are thrown in with one kind of weft, and “then a certain number of the stouter weft.” Transverse strips of stouter material are thus produced on the cloth. In the same way, certain portions of the warp at regular intervals may be formed of a stouter yarn.

[Printed, 1s. 6d. Drawings.]

1862.

A.D. 1862, February 13.—N° 382.

BROWN, WILLIAM HENRY.—(*Provisional protection only.*)—

“Yards, fore and aft booms and gaffs.”

The entire Specification runs as follows:—

“My Invention in yards consists in forming the central “part of yards of metal and tubular, and in inserting arms “of wood into the ends of the tubular centre to complete “the yard.

“My Invention in booms and gaffs consists in forming the “parts near the mast called the jaws of iron with a socket, into “which I fit wooden spars to complete the booms and gaffs.”

[Printed, 4d. No Drawings.]

A.D. 1862, February 26.—N° 530.

MEDHURST, JOHN.—Reefing and furling square sails.

The yard consists of an iron tube slotted along its length.

In the tube is a roller on which the sail is wound, and the slot allows it to pass out. The sail may be laced to a strip of canvas attached to the roller. "The apparatus is actuated in the following manner:—A chain from the deck passes through a sheave in the mast over the yard, and then round a chain wheel fixed to and above the yard at the slings; the chain then passes up and around a second sheave on the mast, and then returns to the deck, so that when the yard is lowered by slacking off one end of the chain, the whole weight of the sail, roller, and yard being pendant on the chain will cause the chain wheel to revolve. This chain wheel puts in motion two axes extending in either direction towards the extremities of the yard. These have pinions at their ends, which gear with cog wheels at the ends of the roller to which the sail is attached. As a security against the roller being bent," "there is a broad hook made by preference of sheet iron, and so placed as to support the middle of the roller. This hook is connected with a purchase, so that when the sail is set, or after it has been reefed, the hook may be made to take the weight of the sail. Both ends of the chains are arranged so that they may be hauled on or slacked off from the deck." In reefing courses the roller and hollow yard are stationary, and the roller is driven from the deck by an endless chain passing round the chain wheel. The apparatus may be made to stow the whole of the sail; or only to take in the reefs.

[Printed, 8d. Drawing.]

A.D. 1862, March 17.—N^o 730.

LORD, WILLIAM BARRY, and GILBART, FREDRICK HUGHES.
—"Raising, lowering, and releasing ships' boats."

Through the keelson of a boat amidships, and under or nearly under a thwart is passed a bolt, the end of which is secured by a countersunk nut, or otherwise. This bolt forms the shank of a metal block through which is a slot; "a flat circular piece or disc bearing a head and ring is fitted into the block and works (on a spindle) within the slot. A portion of the disc is cut out to permit the introduction of two hooks into the slot," each of which "is furnished with a notch and a hole through which to pass the bight of the lowering ropes. The hooks are inserted side by side within the slot, but

“ coming from opposite directions.” “ When the hooks are in position within the slot, the head of the disc is (by means of a lanyard attached to a ring) pulled down ; it thus secures the hooks in position.” From the eye and shank of each hook the lowering rope passes through eye bolts, secured in the kelson. “ Perpendicularly (or nearly so) over these eye bolts are lugged rings, or plates having lugs ; these rings or plates are held suspended over the eye bolts, by means of lashings passed through the before-mentioned lugs, and attached to the sides of the boat. The ropes which pass fore and aft from the shanks of the notched hooks, serve to suspend the boat from the ships’ davits, and by hauling on to or releasing these ropes from the belaying pins, the boat is raised or lowered. The apparatus may be cased in as far as the eye bolts.”

On the davits is fitted “ a grooved catch or slide.” “ At the end of the sennet or rope which is passed over the boat to prevent its swaying from the motion of the vessel ” is attached a slide pin, “ the head thereof fitting loosely into the groove formed in the catch or slide, when the boat is secured, and sliding down and falling out of such groove when the boat is lowered.”

To let go the boat after lowering, the lanyard is pulled, and this causes the head of the disc to assume a vertical position. “ This movement brings all the slots or openings in the block, disc, and hooks square with each other,” and the hooks are released. “ To lift the boat the hooks are passed each through one of the suspended rings or plates, each through one of the eye bolts passed right and left into the open block, the lanyard is pulled down, the whole secured, and the boat is hauled to the davits (in the ordinary manner) by means of the ropes attached to the notched hooks before mentioned.” Instead of the notched hooks a pair of links may be used, to be operated by a short lever instead of a lanyard ; “ a bolt or pin in a lock-piece fixed as before directed in the centre of the boat receives a pair of links answering the purpose of the notched hooks, the bolt being withdrawn by means of a lever from the lock-piece or socket ; the links pass through the suspended rings in the same manner. This arrangement is intended to be used for boats of small size.”

[Printed, &c. Drawings.]

A.D. 1862, March 18.—N° 751.

DUNN, THOMAS.—Bridges, armour-plated ships, and various other structures.

The patentee describes an armour-plated ship, in which “the masts are made to lower down out of the way of shots “by right and left-handed screws and strong nuts.” No other “portion of the Specification refers to the present series.

[Printed, 2l. 13s. Drawings.]

A.D. 1862, April 2.—N° 932.

MOORE, THOMAS.—Winding apparatus for fishing lines, &c., leaders for similar purposes, &c.

Besides various matters not included in this series, the patentee describes a “crutch” for conducting a fishing line, lead line, &c., over a boat’s gunwale. It consists of a fork, on the inside of each prong of which is fitted a roller working on an axle at right angles to the prong. Space is left between the ends of the rollers to admit the line. Across the bottom of the fork is another roller over which the line runs. “These travellers or leaders can also be applied to travel on “the stays, masts, or rigging of ships, or to run up and down “on the lappet, apron, or bonnet of a sail” “in which cases “the cross roller may be dispensed with.”

[Printed, 8d. Drawing.]

A.D. 1862, April 4.—N° 962.

BUTCHER, MATTHEW. — (*Provisional protection not allowed.*)—“Reefing and furling sails from the deck.”

It is stated that “reef tackles, clew lines, bunt lines, reef “points, studding sail booms, and boom irons” are dispensed with. “Two booms are introduced, which supply the place of “the common yard and are jointly only $\frac{1}{4}$ ths of its usual size.” “The topsail can be reefed with one rod if the other is out “with a studding sail set. The topsail is set with much “ease, as the revolving hoop on the yard works on rollers, “and the tie being round it acts as an auxiliary power.” There is a “cog wheel working on the revolving hoop” and “the cog wheels are made of corresponding size so that when “the sail is being lowered down, it is rolled on to the boom “in equal proportions. The band with a self-acting suspender

" draws out and in as the sail increases or decreases in bulk.
 " The boom on which the sail is rolled is made of such a form
 " that the leach rope and canvas are rolled up equally and
 " with no more strain on one than on the other."

[Printed, 4d. No Drawings.]

A.D. 1862, April 5.—N° 974.

COLLING, JOHN.—"Reefing ships' sails."

Below the upper yard a roller is fixed in bearings. On each end of the roller is wound a chain, and these chains pass over blocks on the ends of the yards to blocks on the cap of the top-mast or in other convenient position and thence to the deck. To furl the sail the halliards are let go, the weight of the yard comes on the chains, causes them to unwind from the roller and in so doing to rotate the roller and roll the sail (which is attached to it) thereon.

To support the roller there is a "crutch piece" "which encircles the roller and sail wound upon it with the exception of a split or opening at which the sail enters and leaves." Friction rollers are fitted to the inside of the crutch.

[Printed, 8d. Drawing.]

A.D. 1862, April 10.—N° 1027.

COLES, COWPER PHIPPS.—Masts.

The mast is formed of a central tube and two side tubes of iron or steel. The central tube is carried down the keelson and stepped therein, and the side tubes are stepped in the bilge, or cut short and secured to the lower deck. The central tube is "carried in a direct line while the two side tubes extend from the central tube at their bases and are carried up at an incline till they unite with the central tube at or near the upper part." "The central tube is continued upwards to form the top mast, or a separate tube is fitted thereto." Also "cross trees may be fitted at the junction of the tubes and a top for carrying a topmast" instead of such a tube. The mast is thus self-supporting, and shrouds, &c. are not required. The tubes are united by rods which may support floorings for riflemen. In the tubes are apertures through which ropes pass for working the sails. These ropes are

carried to the lower deck. The inventor prefers the sails should be fitted with "Cunningham's patent reefing apparatus."

[Printed, 10d. Drawing.]

A.D. 1862, April 14.—N° 1071.

HARRATT, CHARLES.—(*Letters patent void for want of Final Specification.*)—"Masts, yards, and booms."

The following is all the Specification :—

"The object of part of the invention is to construct masts strong enough to stand up against the pressure of the wind upon the sails without the aid of standing rigging."

"For this purpose a mast is constructed of a series of concentric tubes of sheet metal, the interstices between them being filled up with melted or dissolved india-rubber, or it may be pitch or other matters which can be made fluid, and will afterwards set solid, and yet remain flexible. The specific gravity of india-rubber is much less than that of iron, and a mast constructed as above-described will remove all danger of a collapse or change of form upon pressure."

"The iron of the tubes is rolled into the form of segments of circles; these are united to form circles, by welding to them bars of iron running lengthwise of the mast, these bars are all welded to each other, and thus form internal stays, which give further strength to the hollow tube. Yards and booms are made in the same manner."

[Printed, 4d. No Drawings.]

A.D. 1862, April 22.—N° 1172.

JOHNSON, JOHN HENRY.—(*A communication from Jean Pierre Victor Le Rouge and Jacques Henri Charles de Berly.*)—(*Provisional protection only.*)—"Propelling and manoeuvring ships."

It is stated that a propeller may be worked by "a wind wheel or other motor capable of being worked by the force of the wind." A screw propeller driven by a steam engine may be fitted in a moveable frame to which a vane is attached, so that the position of the propeller may be regulated by the direction of the wind and the vessel thus steered off a lee shore.

[Printed, 4d. No Drawings.]

A.D. 1862, May 10.—N° 1405.

MOORE, ROBERT.—Structure and appliances of ships.

In the Provisional Specification the inventor says :—" I fit
 " and rig masts intended to carry latteen or latine sails and
 " auxiliary power applied thereto in such manner that the
 " carrying of such sails and others set aloft on the same mast
 " may be rendered safe and available for all classes of navig-
 " able vessels. This is effected by any auxiliary power,
 " which is set in motion with or without the manual power
 " of the crew, and acts on the tackle for hoisting. There is
 " an arrangement by a guide or guides attached to the mast
 " and by guys acting with the hoisting gear for steadying
 " the yard in hoisting, shortening or lowering the sail. There
 " is an arrangement for securing the yard when hoisted, and
 " contrivances for the ready lowering and shortening such
 " sails." No allusion to this part of the invention is made in
 the Final Specification.

No other of the improvements described refer to the present
 series.

[Printed, 8d. Drawing.]

A.D. 1862, May 16.—N° 1493.

SHARPE, BENJAMIN.—Ship-building.

The inventor, among other improvements, makes tubular
 masts of thin iron plates alternating with pieces of wood. The
 plates, &c. are arranged radially. Tarred felt, &c. may be
 placed between the wood and iron. The whole is kept to-
 gether by "iron rings having a surface of shear steel." To
 render the mast shot-proof, these rings are placed close
 together. Another mast may slide within the one above
 described. Bowsprits may be made "in two pieces like the
 " legs of shears, having the lower parts to slip into moveable
 " sockets, or into a piece of wood placed across the deck, so
 " that the whole may be brought into a vertical position, and
 " guns fired ahead between the two parts."

[Printed, 1s. 4d. Drawings.]

A.D. 1862, August 7.—N° 2216.

CLARK, WILLIAM.—(*A communication from Barton Ricket-
 son.*)—"Rig, spars, and sails."

1. The two arms of the yard are made of separate pieces of timber, and are united by metal cheek pieces so as to leave an opening through which the mast passes. One of these cheek pieces is moveable, so that the yard can be placed on the mast and secured on it. Shoulders may be formed upon the masts on which the yards may rest, and the mast may be made all in one piece instead of there being a separate top-mast, &c. One arm of the yard is longer than the other, so that the sails may "operate like fore and aft sails."

2. The "two upper yards" may "slide down the upper portion of the mast." In large vessels "any number of the upper yards" may be thus fitted.

3. An improved jackstay.—Along the yard is secured a "fixed cleet," hollowed out to receive the bolt rope. Alongside of this a row of hooks is fixed, under which fits a wooden slide, similarly hollowed to fit the bolt rope. Between these the sail is held. An iron rod is secured along the yard to which the reef points are made fast in reefing the sail.

4. The foot-ropes are attached to the yard by "rigid hangers" of wrought iron, &c., so as to "keep the said ropes well out from the sail outside of the shrouds," "thereby enabling the said ropes to be continued past the mast all along both sides of the yard and on opposite sides of the mast."

5. The shrouds are secured to the mast by "hooked straps" of iron inserted through the mast, and plates applied under the said straps outside of the mast."

6. Metal blocks with sheaves are used instead of dead-eyes for setting up the standing rigging. For each shroud two blocks are used; one is fastened to the end of the shroud, and the other is connected to a plate bolted to the ship's side. Each block has two pulleys on the same spindle with a loose plate between them carrying an eye to which one end of the lanyard is made fast; the lanyard passes over the pulleys of the upper and lower blocks, and is then secured to the eye on the other block.

7. "Travelling back stays and head stays" are applied to masts. The stays are fixed at their lower ends to slides working in "curved ways attached to the hull of the vessel within the bulwarks," "the curvature of which is in the form of arcs concentric with the points of attachment of the upper ends of the stays." The stays are fixed above to a ring turning on the mast on a shoulder.

8. "Revolving stays and outriggers" are fixed to a mast. The outriggers are attached to links on the opposite sides of the mast and are fastened together by a connecting bar which holds them at an angle of about 90°. Stays attached above and below to the mast, pass through the ends of the outriggers.

9. A method of attaching courses and topsails to the mast. These, as well as other sails, are divided vertically down their centres. They "have attached to their inner edges, that is to say, to the edges nearest the mast at suitable intervals, "travelling bows," which slide upon T-iron rods fixed to the mast.

10. Studding-sails are attached to square-sails by metal slides, attached to the studding-sail, and working on the leach rope of the other sail.

11. "The lower outer corner of a sail" is furnished with a "metal bar having at its lower end an eye to form the cringle of the sail, and another eye for the attachment of the bolt rope, and extending some distance up the side of the sail, where it is provided with a cavity for the reception of the leach."

[Printed, 1s. Drawings.]

A.D. 1862, September 6.—N° 2461.

SNIDER, JACOB, junior.—Applications of graphite.

Among other applications of this material it may be used as a preservative for sail cloths, &c. A "composition" and a "paint" are to be prepared in the manner described in the Specification of Ralston's Patent, No. 3024, A.D. 1861. The cloths are immersed in a hot bath of the "composition" and dried. When dry a coat of the "paint," with the addition of some drying material, is laid on with a brush.

[Printed, 4d. No Drawings.]

A.D. 1862, October 7.—N° 2710.

CUNNINGHAM, HENRY DUNCAN PRESTON.—Working ships' guns and apparatus connected therewith.

In the Provisional Specification the following passage occurs, it is the only one referring to the present series.

"As regards the sails, rigging, and spars, I rig the ship in such manner as to allow as far as possible of her sails being

“ taken in and set from below. For these objects I construct the lower masts with long mast heads. I place the topmasts abaft, or on the aft side of the lower mast, working up and down upon the lower mast head; I have a topsail yard and sail fitted on my system for reefing from the deck; I have the sail so fitted as to roll up almost entirely to the foot. On the topmast I have another yard and sail on my system, which can also be rolled up from below, and with the men under cover. The placing of the topmast abaft the lower mast facilitates the operation of striking it.”

The “system” referred to is presumably that described in previous Specifications, No. 13,368, A.D. 1850; No. 1640, A.D. 1855; No. 2109, A.D. 1856; No. 596, A.D. 1857; No. 3068, A.D. 1857; No. 248, A.D. 1859; No. 440, A.D. 1860; No. 380, A.D. 1861.

[Printed, 4s. 6d. Drawings.]

A.D. 1862, October 14.—N° 2767.

HARRATT, CHARLES.—“Ships’ masts.”

The ordinary stays and rigging are dispensed with, and the mast is supported by “buttresses” of iron, broad below and tapering to the top. The mast is built up of rolled angle iron rivetted together, care being taken to break joint as much as possible. The buttresses are of “hoop iron,” and are built up of separate pieces. Hoops encircle the mast and the buttresses, and the spaces between the buttresses are filled up with teak. Similar buttresses may be applied to ordinary masts. A mast thus rigged may have on the cross trees an iron hoop supporting a collar. This collar “is free to move all round the hoop and carry with it the yard and sail; there is a similar hoop and collar on deck to carry round the foot of the sail.”

Elaborate calculations are given for the size, weight, &c. of the mast.

Reference is made to No. 673, A.D. 1853.

[Printed, 1s. Drawings.]

A.D. 1862, December 12.—N° 3382.

MILLS, ABEL.—(*Provisional protection only.*)—**Reefing sails, rotary yards, &c.**

The following is the whole Specification :—

“ As to the reefing and unreefing, furling and unfurling of the
 “ sails, it consists of holes made in the sails, which are worked
 “ on rotary yards or rollers ; there is a hoop fitted on the
 “ rotary yard or roller, in which hoop is fixed a hook, which
 “ as the yard revolves catches a pall or shackle fitted on a
 “ hoop on the other or fixed yard, as the yard revolves the
 “ hook before mentioned leaves the shackle and goes through
 “ the holes in the sail, which are disposed at such distances
 “ as that the hook will go through one hole at each revolution
 “ of the yard until the sail is completely reefed, furled, or
 “ stowed. In unreefing or unfurling, a line attached to the
 “ end of the pall raises the pall from the hook until the
 “ sail is set, then by slackening the line, the pall attaches to
 “ the hook again.

“ As to the journals in which the sockets or ends of the
 “ rotary yards work, this is an application to the journals of
 “ an iron stay or stays by which the strength and bearing
 “ power of both yards is materially increased, the parrel or
 “ sliding piece is improved by the addition on the aft side of
 “ it of a down haul ; the rotary yard or roller is strengthened
 “ by cross iron let into it all through, the yard being divided
 “ into two or four pieces for the purpose of receiving the
 “ iron.”

[Printed, &c. No Drawings.]

1863.

A.D. 1863, January 28.—N^o 249.

COOK, HENRY OCEANUS, and TERREY, ELIJAH GEORGE.—
 “ Propelling ships and vessels.”

Four vanes of curved form are attached to a tube which revolves between guide rings at the top of a vessel's mast by the action of the wind. The motion thus obtained is used to work propellers or pumps by suitable gearing. The vanes are kept extended by stays, so that if these are removed the apparatus can be folded close to the mast. The apparatus may be used in addition to sails and may be fitted inside the

rigging, the braces and running gear being led clear of the vanes. It may be applied to one mast, or to all the masts. When sails are not used telescopic masts are preferred.

[Printed, 8d. Drawing.]

A.D. 1863, February 14.—N° 407.

THORNE, THOMAS.—(*Provisional protection only.*)—"Disengaging ships' boats."

"To the keel of the boat two sockets are firmly bolted, and into these sockets are passed the lower ends of two suspending rods, the ends being formed with long slots and the sockets provided with bolts passing through the slots in such a manner as to allow of the suspending rods having a certain amount of vertical motion in the sockets, but not of their being withdrawn entirely. At the upper end of each suspending rod is a slip hook, which is kept closed by a guard link attached by a rod to the socket and sliding on the suspending rod. The boat is supported by passing two hooks attached to two blocks (running in the bight of the davit tackle falls) into the slip hooks at the upper ends of the two suspending rods. The stem and stern of the boat are supported by means of links or rods connecting them respectively to the slip hooks. When the boat is hanging at the davits, the suspending rods are held fast in the sockets by means of two locking bolts, both connected to one rod, the end of which is attached to a lever in the stern or other convenient part of the boat. When the boat is lowered into the water, upon pulling this lever both bolts are simultaneously withdrawn, when the suspending rods slide in the sockets just sufficient to draw the guard links off the ends of the slip hooks, thus instantaneously disengaging the boat from the falls at both ends."

[Printed, 4d. No Drawings.]

A.D. 1863, February 24.—N° 515.

LAPTHORN, WILLIAM HENRY.—(*Provisional protection only.*)—"Reefing and furling ship's square sails."

The inventor says :—

"My improvements in reefing square sails consist in the application of cords or ropes to the upper part of the sail, which descend from the yard, and are rove through thimble loops

“ worked on to the reef bends. I usually employ two of these
 “ reefing lines toward each end of the yard, one being beyond
 “ the breadth of the sail, and the other some distance within
 “ its limits, that beyond the breadth of the sail being rove
 “ through thimbles carried by short tabs or loops of rope pro-
 “ jecting from the roping of the sail ; the lower end of these
 “ outside lines leads and is secured to the side ropes of the
 “ sail, the tabs above, through which it leads, being of a
 “ length according to their position on the sail, to make up
 “ for its decreasing breadth upwards, and to lead the line in a
 “ vertical direction, and parallel with the other line or lines.
 “ The lines are carried over pullies in the yard, and conducted
 “ toward the mast, and carried over other pullies on the yard
 “ near to a mast up to a fixed point to which they lead ; or
 “ instead of this being a fixed point at the mast, the cords may
 “ turn over sheaves or pulleys, and thence descend to the deck.
 “ After passing over the first pullies near the end of the
 “ yard, the two cords may be united and pass towards the mast
 “ as one ; reef points may be applied to the reef bands as
 “ usual.”

“ In addition to the two lines at the end of the yard men-
 “ tioned, I apply another one in the middle of the sail, and
 “ conduct it to a fixed point on the mast ; other intermediate
 “ reefing lines may be adopted between this centre one and
 “ the extreme pairs before described.”

[Printed, 4d. No Drawings.]

A.D. 1863, March 16.—N^o 701.

OLIVER, EDWARD, and MYERS, GEORGE.—(*Provisional protection only.*)—“ Lowering and disengaging boats.”

The following is all the Specification :—

“ Our invention consists of an apparatus by which a boat
 “ can be lowered into the water upon an even keel, and both
 “ ends instantaneously freed from the tackle, and is as follows :
 “ —Over the boat is a tube having a rod or bar in the inside,
 “ furnished with a right-handed screw at one end and a left-
 “ handed screw at the other ; over the screwed portions nuts
 “ are made to travel as hereafter explained. The tube is
 “ fitted at each end with a pulley block and a weighted hook ;
 “ on the weighted hooks the boat is suspended, the points of

“ the hooks being held by the nuts to prevent the boat leaving them until disengaged. The ropes pass round the pulley blocks on the ends of the davits, and from thence to barrels fitted to suitable framing firmly bolted to the deck of the ship. The barrels are geared and their rotation is governed by means of a break under the control of a man in the boat. The rod or bar has at one end a small hand wheel by which it is turned.”

[Printed, 4d. No Drawings.]

A. D. 1863, March 16.—N^o 703.

WILLETT, THOMAS WILLIAM.—“ Reefing and furling square sails.”

“ The sail is bent to a wooden roller secured on the fore part of the yard by suitable bearings at each end, and supported in the centre by a roller claw firmly secured to the mast, and of sufficient size to receive the centre sail when wound up on the roller spar. A solid or hollow metal rod of equal length to the roller spar is secured, and turns in suitable bearings fixed near the ends of the yard, and forming part or closely connected with those in which the roller spar turns. Each end of the metal roller is furnished with a cog wheel, which gears with a similar wheel on the ends of the roller spar. On the centre of the metal roller is a chain wheel, grooved similar to the chain wheel of a clock, for the purpose of forming a secure hold for a chain, which after passing over it is lead through two sheaves fixed in the mast, one a short distance above the other, but both higher up in the mast than the yard would be if the sail was set. The chain is of sufficient length to permit the furling and unfurling of the sail, and the two ends are attached to two haliards, by which the apparatus is worked from the deck. Thus when the sail is set, by slackening away the upper haliards the yard will descend from its own weight, and the metal rod will be put in motion by the slackening of the chain, and communicate its rotatory movement to the roller spars by means of the cog wheels, and so reef the sail to any size required. By tightening the upper haliards the sail is set.”

[Printed, 10d. Drawings.]

A.D. 1863, June 11.—N° 1463.

ELLIOTT, THOMAS ALEXANDER.—(*Provisional protection only.*)—"Reefing topsails and courses."

The invention "consists in suspending the yard by means of swing rods connected at or about the centre to an arm or arms projecting from one or more rings or hoops free to move up and down the mast, and connected to haul-yards, whereby the yard is raised or lowered as required. For the courses, as the yards do not require to be raised or lowered, the swing rods are connected at their centre to an arm projecting from some fixture on the mast. At each of their outer ends the swing rods are connected to cross heads, the axes of the yards are supported in and protrude beyond these cross heads, and the protruding ends have fixed upon them a toothed pulley or similar contrivance; a plain guide pulley or roller is also fixed upon each of the cross heads both above and below; a chain carried from the deck is passed through a block suspended from the arm to which the swing rods are connected, through the plain pulley on the upper side of the cross bend at one end of the yard round the toothed pulley, then through the plain pulley on the under side of the cross head, and back through the block down to the deck, and a similar chain is similarly carried round the toothed pulley on the other end of the yard. For convenience sake, after returning through the block the two ends of each of these chains are united into one and carried down to the deck as one chain. In order to reef the sail the yard is caused to rotate by hauling on the chains, whereby the sail is rolled up upon the yard, the sheets of course being slacked to allow the foot of the sail rising. To let out the sail to any extent required slack away the chains and haul upon the sheets."

[Printed, 4d. No Drawings.]

A.D. 1863, June 17.—N° 1515.

MILLS, JOHN.—(*Provisional protection only.*)—"Square rigging of vessels."

The following is the whole Specification:—

"My invention has for its object improvements in the system of square rigging, known as 'the double topsail yard

“ ‘system.’ To carry out my invention I remove one of the yards (either the topsail yard or the topgallant sail yard) with all the gear attached thereto, and I make the upper topsail and the topgallant sail all in one sail. This sail I cause to be reefed or furled from the foot upwards by being rolled upon a spar or roller revolving in suitable bearings fixed near the extremities of the lower topsail yard, which is attached to the cap of the mast. To the revolving spar or roller the necessary rotary motion for furling the sail is communicated as follows:—The revolving spar or roller, where the sail is unfurled, has wound round each end a length of reef lines or chains equal to the amount of the sail to be furled. The remaining portions of these reef lines or chains are carried thence through blocks or pullies fixed on the lower topsail yard near the above-mentioned bearings, and over blocks or pullies fixed to the cross-trees of the topmast to the deck. By hauling on the reef lines or chains the revolving spar or roller is caused to rotate, and the sail may be thereby reefed to any extent or completely furled.”

[Printed, 4*l*. No Drawings.]

A.D. 1863, July 27.—N^o 1864.

THORNE, THOMAS.—“Disengaging ships’ boats.”

“To the keel of the boat two sockets are firmly bolted, and into these sockets are passed the lower ends of two suspending rods, the ends being formed with long slots, and the sockets provided with bolts passing through the slots in such a manner as to allow of the suspending rods having a certain amount of vertical motion in the sockets, but not of their being withdrawn entirely. At the upper end of each suspending rod is a slip bolt or pin, secured by a lever clamp, which is kept closed by passing through a slot in the thwart, or by a guard link attached by a rod to the socket, and sliding on the suspending rod. The boat is supported by passing two hooks attached to two blocks (running in the bight of the ‘davit-tackle-falls’) under the slip bolts or pins at the upper ends of the two suspending rods. The stem and stern of the boat may be further supported by means of links or rods connecting them respectively to the suspending rods. When the boat is hanging at the davits the suspending rods are held fast in the sockets by means of two locking

“ bolts, both connected to one rod, the end of which is attached to a lever in the stern or other convenient part of the boat. When the boat is lowered into the water, upon pulling this lever both bolts are simultaneously withdrawn, when the suspending rods slide in the sockets just sufficiently to draw the projecting ends of the lever clamps through the slots or the guard links, thus releasing the slip bolts or pins and instantaneously disengaging the boat from the falls at both ends.”

[Printed, 8d. Drawing.]

A.D. 1863, August 6.—N° 1937.

DOWSON, JOSEPH EMERSON.—“Application of rolled metal plates.”

These plates are applied to various useful purposes. Among others plates bent to the required circular shape with internal or external flanges may be used to form masts, yards, &c. The plates may form any portion of the arc of a circle, and the flanges may be bolted or rivetted together in any manner preferred. A “fitch plate or plates” may be fixed inside the mast, &c. to strengthen it.

[Printed, 10d. Drawings.]

A.D. 1863, August 12.—N° 1995.

NEWALL, ROBERT STIRLING.—“Serving ropes for ship’s rigging.”

Motion is given by an endless band from a fly-wheel to a bevel wheel mounted on a table which runs on wheels on a railway. Thence motion is given to a wheel mounted on a horizontal hollow spindle through which the rope to be served passes. On this spindle is also an arm carrying a horizontal bar which operates on the handle of the serving mallet. The serving mallet (a block of wood rounded out to fit the rope) has attached to it arms which carry the bobbin of yarn. The yarn is led over a hook on the handle of the mallet, and thence round the rope. By actuating the apparatus, the mallet is carried round the rope and the rope thus served with yarn. As the yarn is wound on the rope, the mallet is carried forward and when it reaches the end of the operating arm the machine is pushed forward along the rails, and the operation repeated.

[Printed, 10d. Drawing.]

A.D. 1863, August 17.—N^o 2041,

BAILLIE, ROBERT.—Reefing and furling sails.

"The topmast has fitted to it a moveable ring or slide, which traverses easily up and down the mast. The slide is connected by means of a stud and socket, or in any other convenient manner, with the topsail yard, so that when hauled upon by means of a pitch chain halliard the yard may be readily raised or lowered either by its own gravity or by means of a second halliard." "The topsail yard is made, by preference, of metal; it is of a tubular form throughout the greater portion of its length." "On the fore part of the tubular yard is a longitudinal slot of sufficient length to admit of the topsail passing through it and into the tubular cavity of the yard. The yard is fitted internally with a longitudinal rod or shaft, upon which the sail is wound; this shaft is carried in suitable bearings, and at each extremity is a wheel, which is arranged opposite a slot cut in the yard to allow of a pinion on the outside gearing with the contiguous wheel. The two pinions on the outside of the yard are carried on the ends of a longitudinal shaft, carried in bearings projecting laterally from the yard. At the centre of this external shaft is a pitch chain pulley, which is put in motion by the lifting halliard, and thus gives motion to the pinions at the ends of the shaft. The lift halliard is carried up from the deck over a pulley at the topmast head, down below the pulley on the external shaft, and upwards over a block at the topmast head, then downwards, and is fastened to the yard. When the halliard is hauled on, the yard is raised, and the action of the chain on the pulley on the yard causes the shaft to be put in motion, and so unfurl the sail by the rotatory motion of the internal shaft. The reefing or furling of the sail is done by means of a halliard, which is made fast to a convenient part of the mast, and carried through a block hung to the yard, and thence down to the deck. When this halliard is hauled on, the yard is brought down, and in its descent the lift halliard causes the external shaft to rotate in the opposite direction to that before described, so that the sail is wound upon the yard." "in some cases this may be accomplished by the weight of the yarn without hauling. The pinions at the

“ ends of the external shaft are covered with light metal hoods,
 “ or the yard may be made of an elliptical figure on one side,
 “ so as to admit of the external shaft and its connected parts
 “ being carried inside the yard.”

The chain pulley may be made conical so that the velocity with which the roller works may be accommodated to the size of the roller as it is increased by the bulk of the sail wound upon it.

The yard may slide “ by a swivel and sliding buckle ” on a rail of T-iron affixed to the mast.

In applying the invention to existing yards, bearings are fixed to the yard in which the roller revolves. Suitable gearing, similar to that above described, is employed to actuate it.

Additional support may be given the revolving spar by a “ pressure roller ” for which, if hollow yards are used, a portion of the yard is cut away. This roller can be removed by a rope from the deck attached to a lever arm upon it.

[Printed, 1s. Drawing.]

A.D. 1868, September 9.—N^o 2228.

OLIVER, EDWARD, and MYERS, GEORGE.—“ Apparatus for “ lowering and disengaging boats.”

“ Over the boat is a tube having a rod or bar in the
 “ inside furnished with a right-handed screw at one end
 “ and a left-handed screw at the other; over the screwed
 “ portions nuts are made to travel. The tube is fitted at each
 “ end with a pulley block and a weighted hook; to the
 “ weighted hooks the boat is suspended, the points of the
 “ hooks being held by the nuts to prevent the boat leaving
 “ them until disengaged. The ropes pass round the pulley
 “ blocks before-mentioned to other pulley blocks on the ends
 “ of the davits, and from thence to barrels fitted to suitable
 “ framing firmly bolted to the deck of the ship. The barrels
 “ are geared, and their rotation is governed by means of
 “ a break.”

“ The rod or bar has at one end a small hand wheel by which
 “ it is turned.” A catch on the tube drops into a notch in the screwed rod to prevent it turning when the boat is secured. The break on the barrel may be taken off by a line raising a weighted lever, the line being carried into the boat so that the boat can be entirely lowered by persons in it.

In a modification, two rods in a tube may be used, one from each end of the tube to the centre ; nuts in which the points of the hooks are held are fixed on the outer ends of the rods, and on their inner ends are racks gearing into a pinion, by the action of which the rods can be moved and the nuts disengaged from the hooks.

The weighted hooks and the nuts may be dispensed with, and the hook of the fixed tackle may be passed over the end of the rods described in the last modification, so as to be let go when the rods are withdrawn into the tube.

[Printed, 10d. Drawing.]

A.D. 1863, September 16.—N° 2276.

TATE, JOHN MACLEAN.—Hanging lower top-sail yards.!

“This invention consists in adjusting and fixing two truss hoops or rings around the top mast for carrying the yard, one of the said truss hoops being fixed above the mast head cap of the lower mast, and the other of the said truss hoops below the mast head cap aforesaid. These hoops are formed with projecting lugs to receive an upright truss bar or bolt ; the ends thereof pass through round holes in said lugs, and are held in position by shoulders formed on said truss bar and a screw nut on each end thereof. The aforesaid truss bar has an eye or round hole formed through same a few inches below the uppermost truss hoop aforesaid, through which passes a truss bolt formed with a shoulder, said bolt being held in position by a screw nut ; the aforesaid truss bolt is also formed with a hinged ring for carrying the yard, to which it is securely fixed. There is a pivot formed on said hinged ring in a line with the truss bolt thereof, said pivot being supported by a hole formed in a stay bar extending from the bottom shoulder of the truss bar before described ; by these means the yard may be turned upright when desired, and the truss bar aforesaid enables the yard to be moved sideways.”

[Printed, 8d. Drawing.]

A.D. 1863, October 23.—N° 2611.

JÜRGENS, JÜRGEN LORENZ.—“Vessels of war.”

The masts of the peculiar vessel described are constructed as follows :—They are hollow, and their centres are formed of metal tubes resting at bottom on plates mounted on ~~trucks~~ *trucks*.

rollers so that they are free to rotate. "Within the outer shell of the masts around the central tube," "but not in contact with the latter, is a casing of india-rubber." The object is that a shot after penetrating the outer tube may be deflected by the inner revolving tube.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, October 28.—N° 2673.

KENNEDY, JOHN.—Ship-building.

Various vessels of improved construction are described, also an improved rig suitable for them. The main-mast is set at a point obtained by taking off "half the extreme length of the vessel at her loaded line" and then taking "a point at the middle of this line." For a three-masted vessel, the fore-mast is "at a point upon the loaded line half way between the mainmast and the point of greatest projection of beak or stern [stem ?] at the continuation of the height of breadth." The foremast is the same height as the mainmast. The jigger mast is placed, "say, four-fifths its own length, abaft the main-mast." "The stop of the fore shrouds and stays" is "two-sevenths of the mast's length below the head, the stop of the main shrouds one-third of the mast's length below the head, and that of the jigger mast one-fifth." Each mast has a "fore and aft stay down from the top of the shrouds to a secure holding at the deck within one or two feet of the mast before it." In large vessels, the line of floatation is divided into equal parts, and a mast fitted in each part. The fore-mast has a stay of the usual sort. On all these stays sails are set with a boom. On each mast is a boom set so as to be parallel with the stay of the mast behind it, and swing clear of it above it. On these booms are sails with gaffs above. On the gaffs are gaff top-sails. The jigger mast has, instead of the sails above described, a triangular or leg-of-mutton sail. The sheets of the "trapezium trysails" pass through blocks on the mast next abaft of each sail, and are led to the deck. The masts may be telescopic and worked by internal gearing. The stays are of chain or wire. A tackle leads from each gaff to the next masthead abaft it to support it.

A four-masted vessel with the above rig is figured. In it the sails have sprits "resting upon the head of each length or section of the telescopic mast."

[Printed, 3s. Drawings.]

M.

N

A.D. 1863, October 30.—N° 2690.

RUSS, BARNABAS.—Ship-building.

Various improvements in armour-plated vessels and batteries are described.

To tighten rigging, &c., male and female screws are used. Masts are made telescopic, of "welded tube." Each portion of the mast has a screw nut in it, and a corresponding nut is fixed to the top of the next length. This nut is in three parts, and is set in a frame on which are levers or toothed wheels for turning the nut. A stop slides in a slot along the mast to prevent its turning with the screw. The nuts may "serve the purpose of cross-trees."

"The boom will work in and out of the bowsprit, and the bowsprit" "in and out of the bow." The bowsprit is made of wrought-iron tube and has a screw thread on its exterior. This screw fits in a nut working between plumper blocks on the deck. By turning this nut the bowsprit is run in and out. A stop works in a slot on it to prevent its turning with the nut. The boom is also formed of wrought-iron tube. "The rear end of the boom is fitted with an elongated nut entering some distance" within it, a female thread being cut therein "to receive a shaft having an endless thread on its exterior; this shaft is the full length of the boom." It is prevented from turning in the same way as the bowsprit.

The yards are "made of tubular iron in two sections or semi-tubes with flanges and bolts or screws to secure them together. The stunsail booms may be iron or wood, and can be worked in or out of the tubular yards by means of screw or other gearing. The yards will be attached to the masts by means of a clip or clips and running fastenings." The boom for the masts will be made of a tubular and taper form of iron, and the stays and rattlings will be made of wire rope; the booms will be attached to the masts by means of grips." When the masts are lowered, the yards and booms "will be passed below through the hatchway."

[Printed, 1s. 10d. No Drawings.]

A.D. 1863, November 19.—N° 2910.

COLLING, JOHN and PINKNEY, DAVID GULLON.—"Reefing
"and furling ships' square sails."

Several arrangements are described for communicating motion to a roller attached to the yard, on which the sail is rolled.

1. Above the yard is a shaft mounted in bearings, of the same length as the roller. Near the middle of this shaft also are bearings, and at its middle a whelp wheel round which the tie goes that supports the yard, one end being fixed to the mast-head and the other to the halliards. As the yard is raised or lowered the shaft is rotated, and the motion is communicated to the roller by endless bands on pulleys on the ends of the shaft and roller.

2. A whelp wheel is fitted at each end of the roller, and doubles of the reefing chains led over the wheels from pulleys "above and below the ends of the yard." Thence the reefing chains are led over pulleys at the mast-head to the deck.

3. Doubles of the reefing chains are led over whelp wheels "mounted on axes fixed to the ends of the yard at right angles to the sail roller axis." The movement is communicated to the roller by gearing.

The yard may be made of T-iron with the angles filled up with wood. This side is rounded off, but the other is left flat or may be concave, so that the roller fits closer. The ends of the yard beyond the roller are round as usual, and these end parts carry the bearings for the roller.

Another improvement "consists in the application of swivel "leading blocks for the conduct of the sheets of the top-gallant sail to the standards on the ends of the yard below" "which lead the reefing chain on the sail roller" as described in the Specification of Colling's Patent, No. 974, A.D. 1862. These prevent the chafing of the ropes against the reefing chains. Separate special standards may be employed.

Another improvement upon the above-mentioned Patent "consists in the application of a crutch or supporting stays "to support and strengthen the standards on the ends of the "yards which conduct the reefing chains on to the roller." This crutch is made "with a curved foot to fit down on the "yard, and at the top with means of attachment to the head "of the block standard."

The rollers for reefing sails may be fitted with springs of any sort by which they are revolved and the sails wound upon

them. The spring may be helical and within a hollow roller, or coiled upon each end of the roller.

[Printed, 1s. Drawings.]

A.D. 1863, December 2.—N° 3035.

CUNNINGHAM, HENRY DUNCAN PRESTON.—Reefing sails.

The invention relates to sails that are reefed by being rolled on rollers attached to the yard, and is partly an improvement upon No. 596, A.D. 1857, &c.

The sail is rolled "from the aft side of the supplementary yard or roller, or that side nearest to the true yard." The improvements are described as applied to a yard in which reefing chains coiled on the roller ends are led through blocks on the fixed yards to a point on the mast above the yard, where they are fixed. The weight of the yard when the halliard is slackened comes on the reefing chains and rolls up the sail.

A new supporting hook for the rolling yard is described. A hook with friction rollers upon it is pivotted on a hoop on the fixed yard, so that it can be turned down to support the roller, or turned up therefrom. It is secured under the roller by a pin. The standards in which the ends of the roller are supported are formed of an arm from a ring on the fixed yard, which arm is curved to receive the spindle of the roller and is slotted to receive a pin which holds the spindle therein.

[Printed, 1s. 2d. Drawings.]

1864.

A.D. 1864, January 6.—N° 43.

ELWELL, JOHN BASSETT.—"Ships' masts and spars."

The invention is thus described by the patentee:—

"In constructing ships' masts and spars according to this invention I form them of tubes composed of sheets or plates of metal connected together in such manner that the joints uniting together the side edges of the plates shall run spirally from end to end of the mast or spar, the plates being for this purpose bent to the requisite spiral form, by which means the

“ masts or spars will be of much greater strength than when
“ the plates are connected together with the joints that unite
“ them running parallel with, and also at right-angles to the
“ length of the mast or spar. The joints that run spirally
“ from end to end of the mast or spar I, by preference, form
“ by making the edges of the plates to overlap each other,
“ and connecting together the overlapping edges by rivets,
“ and where two plates come together end to end, I, by
“ preference, connect them together by butt joints, the
“ neighbouring ends of two plates being each rivetted to a
“ sheet plate that overlaps both of them, this sheet plate
“ being interior of the mast or spar. The sheets of metal
“ employed are made of such a width that it will require two,
“ three, or more plates bent to the requisite curve and con-
“ nected together side by side to form the circumference of
“ the mast or spar. The spiral to which the plates are bent,
“ I prefer to be such that the spiral lines formed by the joints
“ by which the side edges of the plates are connected together,
“ shall pass entirely round the mast or spar in a length equal
“ to about 9 or 12 times its diameter, but this may be greatly
“ varied. Where the mast or spar is required to be tapered,
“ the plates are cut to the requisite taper form, and are bent
“ to the requisite curve which I, by preference, do by means
“ of rollers; strengthening ribs of T or angle-iron may, if
“ desired, be employed interior of the mast or spar.”

[Printed, &c. Drawings.]

A.D. 1864, January 12.—N^o 87.

WHEATLEY, JOHN.—“ Apparatus for propelling vessels.”

A screw propeller is worked by a windmill on deck astern, with or without a steam engine. Arrangements are described for turning the windmill so as to face the wind as may be required.

“ The axis that carries the sails of the windmill turns in
“ suitable bearings carried by a small table or bed, that is
“ supported at a suitable distance above the upper deck by
“ legs or supports, that at their bottom are carried by a
“ double circular ring that is so supported by the deck that it
“ can be turned on its centre, and the axis of the windmill so
“ turned in any desired direction. The ring is for this
“ purpose provided with cog teeth, and is supported by

" rollers or balls, so that it can be turned in like manner to a turntable. The windmill axis has upon it a break and a crank, which by a connecting rod gives motion to a shaft. That by toothed wheels or otherwise gives motion to the screw or paddle shaft; the connecting rod is provided with a swivel joint intermediate of its length in order to allow of the axis of the windmill being turned in any desired direction."

In sailing ships the windmill may be used to work the sails.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, February 22.—N° 443.

GAMBLE, HENRY CUTCLIFFE.—Lowering and hoisting boats.

A roller, somewhat longer than the distance between the davits, is fitted along the ship's side below the boat. On it the ends of the tackle falls are coiled. It has fixed to it at its middle a lanyard which acts a friction strap as it revolves and uncoils from itself the ends of the falls. If preferred a "foot brake" may be used instead. The gripes round the boat are attached by a thimble to a pin on the roller, so that when the roller turns it disengages the pin from the thimble and leaves the boat hanging free on the falls. When hoisted, the boat fits in a "chock," hollowed out to fit the curve of the side. The falls are attached to the boat by tumbling hooks, the ends of which are secured by additional hooks kept in place by wedges below them; these wedges are drawn by lines attached to the davits of such a length as to start them when the boat is close to the water. These wedges being gone, the hooks are free to let go as soon as the weight of the boat is taken off them by the water.

[Printed, 8d. Drawing.]

A.D. 1864, February 25.—N° 468.

VAN WAGENEN, WILLIAM MYER.—(*Provisional protection only*).—"Boat-detaching apparatus."

The following is the whole Specification:—

"The nature of my invention consists in the use of a simple swing bolt, to which the tackle is hooked, secured in or near the stem and stern of a boat, and in the means employed for confining and releasing the same. The free

“ end of each swing bolt is held under the head of an up-
 “ right bolt, or under a horizontal bar or ledge, and is
 “ retained in position or set free by means of a pivoted bent
 “ lever. A notch of suitable size to receive a portion of the
 “ swing bolt is formed at one end of each lever upon its upper
 “ side. To the opposite end [is attached a rod which connects
 “ each of the bent levers with an intermediate lever placed on
 “ the side of the boat at any convenient point between the
 “ said bent levers. The rods attached to the bent levers
 “ extend to this intermediate lever and are attached thereto,
 “ one on either side of the fulcrum or pivot, so that a single
 “ movement of the said intermediate lever sets free one end of
 “ the swing bolts, permitting the hooks of the tackle to slip
 “ off the latter, and thereby simultaneously detaching both
 “ ends of the boat.”

[Printed, 4d. No Drawings.]

A.D. 1864, March 2.—N° 526.

BARLAND, MARGARET, and O'KEEFE, THOMAS.—(*A communication from Thomas Barland.*)—(*Provisional protection only.*)—“Improvements in obtaining motive power,
 “ and in applying the same to the propulsion of ships or
 “ vessels.”

Revolving windmill sails, protected by screens on one side,
 are placed on the deck of a vessel and propel it by driving a
 propeller in the water. The hull of the vessel consists of
 several tubular parts with spaces between them. On the deck
 is “a strong vertical latticework composed of a series of timber
 “ or iron supports or stays, of a sufficient height to carry the
 “ windmill sails set on a shaft or shafts at the top of the
 “ framing.” “A windmill sail may then be placed at each
 “ extremity of the vessel, or if necessary, a third sail may be
 “ arranged amidships, one at each side of the vessel, instead of
 “ in the central line of the deck.”

[Printed, 4d. No Drawings.]

A.D. 1864, March 12.—N° 638.

SYMES, JAMES.—(*Provisional protection only.*)—“Masts for
 “ sailing boats.”

The inventor proposes “in lieu of fixing the mast in an
 “ immoveable socket to allow it to be capable of yielding or

“ slanting over to leeward when a strong and sudden gust
“ of wind fills the sail, thus relieving the boat or vessel from
“ strain and preventing its upsetting. To the seat of a boat
“ two uprights are bolted having bearings therein to receive
“ a horizontal shaft bent downwards into a vertical shaft, on
“ the upper part of which, just below the bend, a socket is
“ fitted through which the mast is inserted; some distance
“ below a second socket is fixed, into which the bottom of the
“ mast is set; below this a spherical counterweight (centrally
“ perforated) encloses the shaft and is secured by a cross pin
“ passing through the shaft below the counterweight. The
“ weight may be set at varying positions or elevations
“ according to the leverage required to counteract the force
“ of the wind. A groove or slot at the bottom of the shaft
“ serves to receive a catch so as to keep the mast fixed at
“ any required time. In ships or vessels the uprights or
“ standards would be fixed on deck, and a space would be cut
“ in the deck or decks to allow of the swinging of the masts
“ and weights.”

[Printed, 4d. No Drawings.]

A.D. 1864, March 26.—N° 761.

CLOUGH, MOORE.—“Reefing and stowing sails.”

A roller on which the sail is rolled is fitted in bearings on the upper yard. On its ends are bosses round each of which a chain is wound. This chain leads through a block on the yard to the centre of the yard, where it is united to the chain from the opposite yard arm. To the bight of these chains another chain is fixed which is carried down to a block below the lower yard, then brought up again and fastened to the halliard. When the halliard is hauled upon, this chain is slackened and allows the roller to let the sail run off it. When the halliard is slackened, the weight of the yard comes on the chain and causes the sail to be wound on the roller.

The roller is supported at intervals by hoops or crutches, slit to allow the passage of the sail, or by hooks. These have on them antifriction rollers. They are fixed to a ring on the yard. The ends of the roller have on them spindles which work in standards on the yard.

A weight may be hung on the reefing chain to assist its working. This weight may slide on a rod or chain affixed to the mast, to prevent it from swinging.

[Printed, 10d. Drawing.]

A.D. 1864, May 6.—N° 1147.

TURNBULL, JAMES.—“Masting of ships.”

“The lower mast is made of iron, the head of the mast
“being made open at the back, but with the sides strengthened
“to compensate for such opening. The cap is elongated a
“little horizontally, or it is made to swivel or turn upon a
“hinge to admit of the top mast being sent up through it in
“a slanting direction from behind the lower mast. When
“the foot of the top mast is raised level with the bottom of
“the back opening it is turned inwards into the opening and
“is then dropped a short distance so as to be held as in a
“socket just below the opening, a plate being fitted inside
“the mast head for the top mast foot to rest on, whilst a fore-
“and-aft projection on this plate entering a notch in the foot
“prevents the top mast from turning. If the cap does not
“swivel or turn, but has an elongated opening, a wooden
“chock is dropped into it after the mast is sent up to make a
“tight and firm fit. The fittings on the mast head for
receiving the top or crosstrees and the rigging may be
variously arranged. It is preferred to fit on a ring, formed
with four sockets, to receive prongs formed on the top or
crosstree piece, such ring resting on lugs formed or fixed
“on the outside of the mast. The top mast is by preference
“made of iron and with masthead arrangements for receiving
“the top-gallant mast similar to those described for receiving
“the top mast. On the top mast, or both top mast and lower
“mast may be of wood, an iron mast head being fitted on the
“wood mast, made shorter than usual to receive it, and
“the arrangements of such mast head being the same as for
“a mast entirely of iron.”

[Printed, 10d. Drawing.]

A.D. 1864, May 17.—N° 1246.

FOSTER, SHERINTON, and ROWDEN, WILLIAM.—“Reefing
“and furling the sails of ships.”

" The top part of the sail is attached to a yard or roller on
 " which it is wound or rolled up when furled and not in use.
 " This yard is rotated when required by means of chains or
 " ropes which pass round the ends thereof, also round the
 " ends of another yard immediately above. This top yard is
 " suspended by two chain or rope haulyards, which take one
 " turn round the central part of the yard, so that when either
 " of these haulyards is hauled upon, and the other let go, the
 " yard will be rotated in a corresponding direction according
 " to whether it be desired to reef, furl, or unfurl the sail,
 " and by the rotation of the top yard, the under yard on
 " which the sail is wound will be rotated by the chains or
 " ropes, which connect the two yards together. The top
 " yard is supported at its central part in bearings in a sliding
 " box which surrounds the mast, and slides up and down
 " thereon as the yard is raised or lowered. To this sliding
 " box is adapted a crutch for supporting the lower or sail
 " yard which rotates therein, and in order to diminish the
 " friction of the yard on its bearings in the crutch, the latter
 " is provided with three or more friction rollers. The ends
 " of the two yards are connected together by links or slings,
 " in which they may both freely rotate. The sliding box is
 " provided with a stopper, and rope or chain, whereby it may
 " be held fast when it is required to furl the sail, for which
 " purpose the yards must be made to rotate on their axes
 " without rising up the mast."

[Printed, 10d. Drawing.]

A.D. 1864, June 20.—N^o 1522.

HEWITT, SAMUEL GEORGE.—Sails.

The invention "has for its object the making of sails which
 " are capable of being set more flatly and are less liable to
 " stretch and get out of shape than those made in the ordinary
 " manner. For this purpose, instead of cutting the canvas
 " in the ordinary manner, thereby involving the necessity of
 " making a number of short cross-cut strips termed 'mast
 " cloths,' " "the canvas is cut into strips or 'cloths,' each
 " of which is of a length equal to the whole depth of the
 " sail, and has its upper end fastened to the gaff or yard, and
 " these strips or 'cloths' are tapered in form so as to suit
 " the gradual diminution in the width of the sail from the

“ bottom to the top. By cutting the canvas into strips of this form, the ordinary tendency to stretch ” “ is diminished. It is preferred to use canvas manufactured of greater width than usual, or otherwise adapted to prevent waste in cutting.”

[Printed, 6d. Drawing.]

A.D. 1864, June 30.—N° 1629.

BALANS, RAYMOND.—“ Jib-sail rings.”

Across the ring a roller is fitted, by which the ring is divided into two parts. The ring has also affixed to it a hold-fast hook.

[Printed, 8d. Drawings.]

A.D. 1864, June 30.—N° 1630.

BALANS, RAYMOND.—“ Hooks for marine and other purposes.”

To the neck of the hook a square spindle is fitted in projecting cheek pieces. On this is coiled a spring the end of which is pressed against the point of the hook so as to close up the opening. The end of the spring fits in a groove in the point of the hook, or may have a stud upon it which fits into a hole in the point.

[Printed, 8d. Drawings.]

A.D. 1864, July 1.—N° 1639.

DAY, THOMAS, senior, and DAY, THOMAS, junior.—“ Reefing and furling sails.”

A roller is fixed in stanchions on the yard. Reefing chains are wound on the roller and led through blocks in the yard to the cross-trees and thence to the mast-head, where they are united and led as a single line to the deck. The yard has the usual halliards and also a downhaul, by means of which it can be raised and lowered to the requisite height, and the sail stretched flat by the reefing chains. Crutches may be used to support the yard at the middle. These have suitable rollers within them to prevent chafing.

[Printed, 8d. Drawing.]

A.D. 1864, July 7.—N° 1689.

SMALLWOOD, WILLIAM.—(*Provisional protection only.*)—

"Reefing, furling, and setting sails."

To the topsail yard is attached "a roller, to which the sail is lashed; this roller is free to turn in bracket bearings carried by the topsail yard in order to reef or unreef or furl the sail, and at its ends the roller is fitted with chain pullies, or its ends may be shaped like a barrel to receive winding chains for the purpose that will be presently explained. Upon the topsail yard is mounted a shaft which is free to turn in suitable brackets; this shaft at or near the middle of its length is fitted with a barrel round which a double halliard or tie is wound, and the ends are then carried up to sheaves at the mast head, and then brought down to the deck and secured as usual; by means of this double halliard the topsail yard is raised and lowered, and by slackening one end and drawing upon the other rotary motion is communicated to the barrel on the shaft. The ends of the shaft are fitted with chain wheels or barrels, and if chain wheels are used, endless chains connect these chain wheels with the wheels on the roller to which the sail is lashed. The rotary motion imparted to the shaft through the halliards will, therefore, be transmitted to the roller, and the rotation of this roller will effect the reefing or unreefing of the sail as desired. When barrels are used at the ends of the shaft, lengths of chain equal to the length of sail to be furled are to be provided. The chains are wound, the one on the barrel on the shaft and the other on the barrel-shaped portion of the roller, and their ends are secured respectively to the barrels and roller ends."

"The improved arrangement necessitates the top gallant sheet leading through clamps on the after part of the top sail yard arm on its way to the block at the quarter of the yard."

[Printed, 4d. No Drawings.]

A.D. 1864 July, 19.—N° 1806.

PHALP, OLIVER. — "Reefing, furling, and setting square sails."

The sails are reefed by being rolled on a rolling jackstay connected to the yard. The improvements are all figured,

but the description given of each is very brief. A whelped wheel is fixed on the end of the rolling jackstay, and a chain passes through a sheave in the yard over the wheel and back through a second sheave, the ends are led through blocks on the tressle-trees to the mast-head and thence below. Or the chains may pass over a whelp wheel on the yard, which may communicate motion by cog wheels to the roller.

An improved crutch to hold the centre of the roller may be formed of a ring with an opening for the sail, fitted inside with rollers, and hinged at the back so as to open to admit the roller.

A clutch may be attached to the sail, on which is a ring which passes over the roller. On the ring is an arm which lies upon the yard to prevent the ring turning. This clutch prevents "the sail from falling away to leeward."

A "clamp suitable for the yards of ships or steamboats" is figured but not described. It apparently consists of a block with a portion of the shell hinged to allow the rope to be taken off. It may have "a clasp to undo like a snatch block," which indeed it precisely resembles in the drawing.

A flat rope may be used for the leaches of sails.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, July 21.—N^o 1817.

HART, JOHN.—"Reefing fore-and-aft sails."

The gaff is connected by a universal joint with the jaws round the mast. It is also pivotted to the joint so as to be free to revolve. At the throat and peak are rings about the gaff, and to them the halliards are attached. A reef tackle is wound on the throat end of the gaff so as to revolve it and wind the sail upon it. To the hoop at the peak a rope is attached which passes through a sheave in the boom; on this is a traveller or clip, which fits over the leach rope and serves to keep the sail stretched while reefing. The hoops on the mast may have similar clips on them, or may be attached to a strip of canvas carrying similar clips. The hoops and travellers are all made fast on a line from the gaff. At the throat of the gaff is a guard over the reef tackle. The gaff is strengthened by two rods of iron let into it.

Instead of the sail rolling on the gaff, it may roll on a frame of rods and rings fitting over the gaff and revolved by similar means to that above described.

[Printed, 10d. Drawing.]

A.D. 1864, July 29.—N^o 1884.

MOORE, THOMAS.—(*Provisional protection only.*)—"Improvements in tubular masts and spars, and in crutches for suspending ships' yards."

Yards, masts and booms are built "with hollow cores." "The hollow tubes may be of wrought metal, either drawn or cast." "Instead of metal the yards or booms may have wooden tubes in the centre strengthened with flat bar iron, or the interior may be fashioned cylindrically with hooped bar iron and then built over with wood." For ventilation apertures may be made in the mast. The tubes are to be covered over with wood secured with marine glue, &c. and the whole hooped. To enable the masts to be cut away they may be made so that "two sections meet above the upper deck." Round this joint a large hoop is fixed.

For supporting a yard, and allowing it to revolve and roll up the sail, the inventor affixes to a sliding hoop on the mast "a swivelled neck next towards the fore part to support a crutch. The topsail tie will be shackled to a ring or eyelet; the stem or shaft of this ring or eyelet will enter a slot on the neck of the parral hoop, and then be loosely bolted to allow it to work. The bottom of the shaft will carry a crutch balanced to rise when there is a strain on the halyards, and fall by its own weight." It is kept back by a bolt. There is also "a double-friction swivelled roller" fixed to "an arm on the ring which supports the lifts." This roller is described in No. 1069, A.D. 1863.

Studding-sail booms are run in and out of the hollow yards. A line fixed to the foot of the boom runs through a sheave at the end of the yard. By it the boom can be drawn out. A similar line attached to the outer end of the boom serves to run it in. The boom may be retained in the yard by a cap at the end, either screwed on or fastened by a bayonet joint.

[Printed, 4d. No Drawings.]

A.D. 1864, August 1.—N^o 1910.

PEARSON, WILLIAM, and SMALLWOOD, WILLIAM.—(*Provisional protection only.*)—"Reefing or furling sails."

"According to one mode" "the sail is secured by its bottom edge to a boom, and by its top edge to a yard as usual. Clew garnets or side chains extend from the boom below (and around the ends of which they are wound as on a barrel) up to sheaves placed at each end of the fore yard, and from thence to the slings near the mast, and over sheaves placed there for the purpose. By hauling on the bight at the central part of the chain, this part is drawn down towards the deck, and the boom is consequently made to rotate and wind or roll up the sail thereon. The 'fore span' extends from end to end of the boom, and is connected thereto by slings or other analogous contrivances, whereby the boom may be held in its proper position, and yet allowed to rotate without interfering with or twisting the 'fore span.'"

"Another mode" "consists in adapting to the yard a roller, on which the sail is wound, and which roller is rotated by means of chains or ropes passed round the ends of the roller, and also round a barrel mounted in bearings attached to the yard. The reefing chains pass over sheaves suitably arranged to conduct them from the sail roller to the winding barrel, which is rotated by means of a reefing halliard, which passes from the deck over a sheave attached to the mast and round the reefing barrel." "By lowering the main halliard, and holding on the reefing halliard, the sail will be close reefed, and by hauling on the reefing halliard the sail will be rolled up on its roller, and thus completely furled."

[Printed, 4d. No Drawings.]

A.D. 1864, August 29.—N^o 2120.

ROWDEN, WILLIAM.—"Reefing and furling sails."

"The object of this invention is to simplify the construction of the apparatus used in reefing and furling sails from the deck. To this end, instead of mounting the roller which carries the sail in brackets affixed to the yard as heretofore," the yard is made to "act the part of a roller," and it is mounted in bearings "carried by supporting chains." "These bearings

“are fitted with lugs above and below the roller,” and through them the reefing chains are passed, “which serve to keep the bearings in position, and also tension chains, which are secured to the bearings and pass to the parrall ring on the ship’s mast. By this means the bearings are kept up to the ends or shoulders of the roller or yard. Or, in lieu of tension chains, a chafing boom carried by the parrall ring may be employed for holding the bearings in position. The reefing chains, the ends of which are coiled round the ends of the roller or yard, are led up through the upper lugs, which should be fitted with antifriction rollers. The yard is raised and lowered by the halliards which are attached to the parrall ring, and pass up to the masthead, and thence down to the deck as usual. The crutch is carried by the parrall ring.”

[Printed, 10d. Drawing.]

A.D. 1864, September 2.—N° 2160.

BARLAND, MARGARET.—(*A communication from Thomas Barland.*)—“Improvements in obtaining motive power and in applying the same to the propulsion of ships or vessels.”

A great part of the Specification is taken up with a description of a peculiarly shaped ship to which the new method of propulsion is to be applied. This method consists in setting windmills on deck, having their sails screened from the wind on one side, so that the wind only acts on half the sails. The power thus obtained drives a propeller. To elevate the windmills, they are set on a raised framework on deck. Separate sets of sails may be used, or a shaft may be mounted fore-and-aft along the deck, on bearings with friction wheels, and sails fitted along it “in a spiral direction.” The screens may have “a self-opening power,” not described, so as to yield to great pressure of the wind and not capsize the ship. Or the screens may be dispensed with, and the sails may be “constructed with shutters which would shut with the wind and open against it.” Also the sails on the shaft may be fixed and used as ordinary sails when the ship is sailing with a side wind.

[Printed, 6d. No Drawings.]

A.D. 1864, September 9.—N° 2203.

CUNNINGHAM, HENRY DUNCAN PRESTON. — Running rigging.

The invention “refers to that description of running rigging “ which is employed for moving round the yards of ships and “ denominated braces, and consists in fitting and working this “ running rigging in the manner of continuous ropes or chains, “ so that the brace attached to one yardarm is continued “ through or over blocks or pulleys or ‘fair leaders’ to the “ other yardarm. The entire brace or that portion which “ constitutes the working part of it, when of chain, is led over “ or upon a barrel or wheel in a machine constructed for the “ purpose.” “The barrel or wheel is whelped or furnished “ with cogs or teeth to lay hold of the chain, so that when the “ barrel or wheel is turned round the chain is drawn in on one “ side of the ship and slackened out on the other, whereby the “ yard is braced round according to the direction in which the “ barrel or wheel is made to rotate.” There are “stoppers or “ controllers for checking or stopping the passage of the “ chain, so as to retain and secure the yard in the position it “ may have been braced to.”

The “machine” mentioned consists of a toothed barrel round which the chain is led, and suitable gearing through which by means of a winch handle or otherwise, motion may be given to it. There are also rollers for guiding the chain to and from the barrel, and clamps, to be pressed down by levers, for checking the action of the chain. The toothed wheel next the barrel is on a sliding spindle, so that it can be thrown out of gear to allow the barrel to revolve freely, and there is a “flap key” on its spindle which can be dropped down to prevent it engaging with the barrel. The apparatus can be fixed to any convenient part of the ship.

[Printed, 10d. Drawing.]

A.D. 1864, September 24.—N° 2343.

TODD, JOHN.—“Rolling, bending, and circling sheets of “ metal.”

The inventor forms, amongst other articles, iron masts yards, &c., by using “top rolls of different diameters and “ either parallel or tapered,” in machines for rolling iron.

M.

O

He applies "additional gearing with pulleys and strap, whereby the top roll by means of the top shaft is elevated or depressed at either end separately, or at both ends simultaneously, as required, by steam power within or by the machine itself, or by using hand wheels on the top shaft the same operation may be performed when that is more convenient than by using the pulleys and strap. The said top rolls may be made of cast or wrought iron or steel of different diameters and parallel or tapered as required. By the application of moveable antifriction bearings fitted into the principal sliding bolsters which suspend and carry the top pressing roll, wrought-iron shafts can be fixed into the said top rolls (when made of cast iron), and in either case have journals to revolve in brass bushes fixed in the antifriction bearings, the latter being made larger in diameter than the top pressing roll, which will allow the top roll to be withdrawn at either end of the machine through the principal sliding bolsters, and through a suitable opening or apertures in either of the two spur wheels (one at each end of the machine) which drive the bottom rolls." "The top roll and antifriction bearings are kept in their places by a lever at each end of the said roll, and by raising either of the two levers the antifriction bearing or the top roll can be withdrawn at that end of the machine at which the lever is raised."

[Printed, 10d. Drawing.]

A.D. 1864, September 26.—N° 2358.

FERGUS, JOHN.—(*Provisional protection only.*)—Reefing, furling, and setting sails.

The object is to enable the sail to be rolled on the yard, so as to obviate the necessity for a rolling jackstay.

Abaft the yard is a "strong metallic tube" with projecting bearings which carry the yard. "The reefing chains are carried through sheaves and blocks and pass into this tube, and thence by one or two turns around the ends of the yard." "The tube is secured to the mast by a parrell, which will admit of the yard rising and falling as required." *By means of the tube the reef tackles are kept from entangling with the rest of the rigging.* "The yard is raised

“ by the reef tackles, which pass through the tube ” and then “ parbuckle round the yardarm, or rack wheels may be used.” “ When it is desired to reef the sail, the reef tackles hoist the “ yard to give sail, and by lowering it reef the sail.” The reefing chains “ are attached to a block on each side of the cap, “ and from thence take two turns round each end of the rolling “ yard, and then through the tube and up to two clamp “ blocks, one at each side of the topmast, and form a bight “ about the mast, to which is attached a block, through which “ the tackle leads to the deck.” To furl the sail without lowering the yard, the latter is caused to revolve without falling, the tackle being slacked off so that the sail is wound thereon. A wooden roller is fixed “ abaft the parrell ” to relieve the friction. “ The brace block is attached to the standard hoop “ connected with the tube end.”

[Printed, 4d. No Drawings.]

A.D. 1864, September 29.—N^o 2399.

ALLIX, GEORGE.—“ Reefing topsails and topgallant sails.”

At each end of the yard is fixed a whelped boss. On the yard inside this boss is a hoop in which the yard is free to revolve. On this hoop are uprights carrying a spindle. On the spindle is a pulley, and from it proceed two rods each of which carries a cap in which one point of the yard fits. From the uprights also rises a forked guide, through two eyes in which the halliards pass. The halliard passes from a block on the mast-head through one eye in the guide, over the pulley on the spindle, round the boss, and back in the same direction. By hauling on the halliards by means of a suitable tackle from the deck, the sail may be rolled on the yard, and so reefed or furled.

An improved parral for securing the yard with the sail rolled upon it is described. On the mast are two hoops united by stays. To the upper hoop is swivelled a cross-bar carrying on it “ claws ” which support the yard. These claws are further connected by a rod, and from each of them a “ guide ” proceeds to the end of the yard, so that the parral is kept in the middle of the yard.

[Printed, 10d. Drawing.]

A.D. 1864, September 29.—N° 2402.

HARRINGTON, GEORGE HENRY, HEWETSON, HENRY, and HEWETSON, FRANCIS YATES.—“Preparing threads and yarn “ to be employed in the manufacture of sail cloth.”

Before weaving, the yarn used for making sail-cloth is steeped in a preparation consisting of 112 lbs. catechu, 112 lbs. ochre, 40 lbs. “oil or fat,” and 2 gallons of tar, boiled in 400 gallons of water. “Other similar tanning mixtures” may be employed in the same way. The object of the invention is to preserve the sails from rotting.

[Printed, 4d. No Drawings.]

A.D. 1864, October 4.—N° 2438.

SWINBURNE, THOMAS ANTHONY.—Reefing and furling sails.

The yard is hollow, and preferably of “thin sheet steel;” it is mounted on suitable bearings. Within it is mounted a roller on which the sail is wound. The sail issues through a slot in the hollow yard. Parallel with the yard is mounted a spindle which has on its centre a pulley driven by a chain whose ends are fast to the mast. From this spindle motion is communicated by endless bands to the roller inside the yard. To support the sail and roller, bands of vulcanised rubber or other pliable material are fixed to the roller at several points, so that they may be “rolled up in alternate plies with the sail.” These bands pass through slits in the upper part of the hollow yard, and are attached to the outer spindle. They are preferably tapering, the narrow end being attached to the outer spindle, so that the greatest breadth may come into use when the sail is unfurled, and the greatest strength required.

[Printed, 10d. Drawing.]

A.D. 1864, October 10.—N° 2489.

SHOREY, THOMAS, and BELL, JOHN.—(*Provisional protection only.*)—Reefing, furling, and setting sails.

Fixed to the yardarm is “a shaft of iron or other metal set “ in suitable bearings or journals suspended from the yard; “ this shaft or axle has at each end a pinion or toothed wheel “ keyed thereon, and these pinions gear into corresponding “ *pinions* at each end of the rolling jackstay. The jackstay is

“ held in position with respect to the yardarm by continuations of the bearings of the shaft or axle, and by plummer blocks or journals, so as to permit of its free rotation. In the centre of this shaft a chain pulley with suitable cavities and stops for the links of the chain to take into and bite is firmly keyed, and above the yard there are set in the mast, one above the other, two pulleys, through and over which haulyard chains coming from the deck are caused to pass, and thence to gear into the chain pulley on the shaft or axle, so that from the deck, by actuating the haulyards, the shaft may be caused to revolve in either direction in order to work the rolling jackstay, and to furl or unfurl the sail contained thereon; it will be obvious that by slacking one haulyard and tightening the other the yard itself may be elevated or lowered, and the sail furled or unfurled, or the yard may be kept in a stationary or fixed position during the operation of reefing, furling, or unfurling the sail.”

[Printed, 4d. No Drawings.]

A.D. 1864, October 10.—N° 2490.

BUTCHART, JOHN, and STROUD, HENRY.—(*Provisional protection only.*)—“Reefing and furling sails.”

The following is the whole Specification :—

“ This invention relates to certain improvements in the method of reefing and furling sails, by the use of which we propose to prevent the chafing of the top gallant sails, which is occasioned by the ordinary chains either going to the yard arms from the masthead, or passing along the upper part of the topsail yard, by making the reefing chains pass through clamps in the topmast down to sheaves in the yard arm, one on each side of the mast, in rolling chocks, and along the after part of the yard to horizontal sheaves in and near each end of the yard; the top sail haulyard leads from the centre sheave in the topmast down to the deck, and is actuated by a block and tackle in order to enable the sail to be reefed or furled, or vice versâ, by means of a supplemental spar or roller in front of the yard arm.”

[Printed, 4d. No Drawings.]

A.D. 1864, October 15.—N° 2551.

BAINES, EDWARD.—“Reefing and furling ships' sails.”

In square sails, the sail is bent to a roller fitted in bearings below the yard. On each end of the roller is a boss round which the bights of an endless chain pass. The two parts of this chain are then led through sheaves on the yard-arm to a whelp-wheel at the centre of the yard. This wheel has three sheaves, two of these are filled by the two endless chains from the sail roller, and the third has round it a chain by which the yard is suspended, and to which the halliards are connected. As the yard is lowered or raised, the roller is revolved by the sail wound on or off it.

For fore-and-aft sails, a similar roller is affixed to the gaff, which is suspended by a rope round a central three sheaved wheel as above described.

[Printed, 10d. Drawing.]

A.D. 1864, October 17.—N° 2561.

BRUCE, JOHN.—(*Provisional protection only.*)—“Fabric suitable for sail-cloths, awnings, tarpaulings, and other purposes.”

The inventor says :—“The object of my improvements is to lessen the cost of manufacturing such surfaces, as well as to obtain them stronger and more durable where the seams would be by weaving the fabric in wide breadths, or breadths equal to two or more narrow breadths, yet having an appearance to resemble seams obtained by the sewing together of narrow breadths, but with greatly increased durability and strength. For this purpose I employ looms adapted in width to the width of fabric to be produced, and at convenient distances across the width of the fabric, where the seams would be found if made up of narrow breadths, extra thick and strong warp yarns, corded or otherwise, are introduced between the ordinary warps, and they are woven into or upon the fabric, so as to run up and give it the desired appearance with increased durability and strength. At the parts of the reed where these extra or thicker yarns are introduced, I form the plates or bars of it stronger and wider apart than at the intermediate parts; and in winding up the woven fabrics I introduce other fabrics between the

“ parts of increased thickness and strength to compensate for
“ such increased thickness at the other parts, or I apply other
“ suitable means to ensure uniformity of weaving.”

[Printed, 4d. No Drawings.]

A.D. 1864, October 18.—N° 2568.

HOWARD, STEPHEN, and WOOD, WILLIAM.—“ Reefing and
“ furling sails.”

This invention consists in using two yards, one a little below the other, but not quite under the upper yard.

“ These two yards are connected by means of an iron with
“ two hoops, one at each end of the yard, the upper hoops
“ being made fast by means of a bolt after it is drove on the
“ upper yard. The lower yard revolves through the lower
“ hoop after having six pieces of iron let in where the reefing
“ chains work to keep it from chafing.”

“ There are two pawlshoops placed one at each end of the
“ revolving yard-arm, and the pawl is attached to each yard-
“ arm iron by a bolt. This pawl and hoop being placed at
“ each end of the yard, in case the reefing chains were to
“ break, the sail would still be in its proper place by the
“ pawl at each yard-arm holding it fast.” “ There is also a
“ spring and tripline at the end of each yard arm, the spring
“ being to assist the pawl in its proper place; the tripping
“ line is used to keep the pawl up when required. It leads
“ through an eye-bolt on the top of the yard-arm iron along
“ the yard and down to the deck.

“ There are two bearers, one on each quarter of the yard.
“ They are fixed so as to screw up and down when required,
“ this screw being placed so as to turn the bearers from
“ chafing the sail.

“ The reefing chains are fixed to an eye-bolt on the revolving yard, then leading through a clamb on the upper yard along to the opposite quarter, through a block up to and under the trussel-trees, then leading down to the deck with blocks and tackles. The blocks are four ordinary swivel blocks, one in each quarter of and two fixed under the trussel-trees by a chain, strap, or bolts.”

[Printed, 4d. No Drawings.]

A.D. 1864, October 18.—N° 2570.

HART, JOHN.—"Reefing fore-and-aft sails."

The boom is fitted at its fore end into a socket, so that it can rotate therein, and the jaws are affixed to this socket. Near this end is a boss, round which passes the bight of an endless chain that also passes over a block at the mast-head. To the descending side of this chain (when the sail is set) the gaff is attached by a short piece of chain, and a tackle is also fixed thereto, so that when the halliards are let go, the weight of the gaff may assist in rotating the boom and rolling the sail on it. The endless chain may also be passed round the barrel of a winch, instead of being carried to the mast-head. The after end of the boom is fitted in a "travelling band" to which the topping lift and the sheet are secured. Alongside the chain on the mast or on the boss, a guard is fixed to prevent the chain slipping off the boss. There is a screwed pin in the socket, by which the boom can be prevented from turning. Hoops and travellers are used for the sail as described in No. 1817, A.D. 1864.

The gaff may be made to revolve instead of the boom, and the arrangements are the same except that the chain round the boss is not an endless one, but is carried over a sheave at the mast-head and to a tackle below. By lowering the gaff, and slacking away this tackle, the gaff is revolved and the sail rolled thereon. There are no throat halliards.

Or, instead of rotating either boom or gaff, the inventor places "at intervals from the travelling band to the boss, hoops " or rings with eyes in each ring for four or five rods. These " rods form a frame upon which the sail is bent," the whole being made to revolve by means similar to those above described for the boom or gaff.

[Printed, 10d. Drawing.]

A.D. 1864, October 20.—N° 2591.

GANDY, MAURICE.—(*Provisional protection only.*)—Reefing and furling square sails.

Bearings are fitted to the ends of the yard in which it may revolve. To these bearings arms are attached which carry blocks for a chain passing round a boss on the yard-arm. *There are also eyes to carry a chafing rod along the yard,*

and a block for the studding-sail halliards. The chains, the bights of which pass over the bosses on the yard-arms, are led along the yard and through suitable blocks to the deck. As the yard is raised or lowered by their means, it is also revolved and the sail rolled off it or on it. A parrel on the mast has a crutch with friction rollers to support the yard, and the one described in the Specification of No. 1913, A.D. 1858, is preferred. A life rod may also be fixed along the yard between the plates in which the yard has its bearings.

[Printed, 4d. No Drawings.]

A.D. 1864, October 27.—N° 2663.

CONGALTON, WILLIAM.—“Fitting sails to ships.”

A number of spars or tubes are fitted across the sail parallel with the yards. Each spar has fixed to it a parrel which travels either on the mast or on an “auxiliary mast” fitted parallel with the mast. These cross pieces are preferably made of three pieces of tube, of which the central one is larger than the others. These are screwed together.

They may also be flat, and may consist of two flat pieces of iron “rivetted together and kept about two inches apart with “ washers.”

The masts are to be all in one length, and the rigging is inclined more aft than usual. The stays are double; they are led down “on each side of the ship,” and are set “in a “ position no further forward than will let the sail brace to “ the point required.” The top-mast and top-gallant-mast have no rigging. The lower yards are suspended “from a “ strong projection, bibb, or cheek at the same elevation as “ the eyes of the lower rigging.” The stays are secured to the end of this “ projection.”

The topsails are reefed by having halliards on each spar, and letting the yard drop to the point required, the halliards on the spar at the proper level being made fast. The courses are reefed by drawing up the lowest spar to the one next above, and so on.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, November 21.—N° 2900.

PANTON, THOMAS WILLIAM, and PANTON, HUGH.—(*Provisional protection only.*)—Shaping the edges of iron plates.

The plates are planed if required, and bent to the form necessary for making masts, yards, &c., by any suitable means. "The plates so bent are fixed to a support, and one or more revolving cutters are applied to each end or edge of such plate, the cutters being fixed to a face plate or plates, and driven in a similar manner to a lathe head. The feed is obtained during the cutting operation by causing the heads and revolving cutters to gradually approach each other by means of screws or any other suitable and well-known mechanical contrivance. The heads and face plates may be so arranged that their axes may be placed at any desired angle with the inner axis of the bent plate, whereby a portion of a cone, cylinder, polygon, or other figure represented by the plate may be accurately cut to a perfectly geometrical section of such figure, and any number of plates so cut to one angle will accurately fit and abut against each other."

The cutters "are of an oblong shape, so arranged and of sufficient length to pass over the whole or nearly the whole of the area to be cut whilst rotating."

[Printed, 4d. No Drawings.]

A.D. 1864, November 22.—N^o 2915.

SHOREY, THOMAS, and GIBSON, GEORGE.—(*Provisional protection only.*)—"Reefing and furling sails."

The inventors "propose to set the lower boom in a bearing or journal fixed in the mast, the boom being extended by an axle or shaft to enter therein, the extremity of the shaft being provided with a toothed wheel, into and underneath which gears a pinion worked by a winch handle. The shaft of this handle is supplied with a ratchet wheel, in which a pall works in order to hold it in position. The rear end of the boom is also provided with a projecting axis, which is let into a metal bearing having a bent collar, which collar is held in position by a rope to the masthead, and by block tackling to the stern. By these arrangements it is evident that when the winch handle is turned in the proper direction the boom will be caused to rotate, and thus wind or furl the sail, which is allowed to descend by slackening the haulyard from the deck."

[Printed, 4d. No Drawings.]

A.D. 1864, December 19.—N° 3150.

BUTCHART, JOHN, STROUD, HENRY, and MORRISON, SAMUEL ALLEN.—“Reefing and stowing jib sails from the deck.”

The invention “consists in attaching a swivel block to the upper part of the jib stay, such block being connected to the mast by the jib halyards, and in applying at the lower part of the jib stay a whelped sheave with swivel attached to the hoop or hounds of the boom; on the boom near or under the whelped sheave are two leading blocks for the reefing chains to pass through and over the sheave; the ends of the reefing chains are attached to two blocks, thus it will follow that by hauling on the reefing chains the whelped sheave will be caused to revolve, and the stay being free at the upper part with the swivel the stay will revolve and take up the sail, and vice versa.”

[Printed, 10d. Drawing.]

1865.

A.D. 1865, January 11.—N° 83.

COUTANCHE, HENRY.—“Reefing and furling sails.”

The description is given as follows in the words of the patentee:—

“My invention primarily consists in attaching to or forming in a piece with a ‘pearl’ or ‘tub’ which is free to travel up and down the mast, what I term claws or grips, which embrace or partially embrace the yard round which the sail is wound, all as hereafter described. These claws or grips are made of a metal frame united by rods loose in the frame, and covered with india-rubber, gutta percha, or other substance to reduce friction as much as possible, so that as the sail is wound round the yard the loose rods revolve and materially facilitate the raising and lowering of the sail. Sometimes I make the rollers of lignum vitæ or other wood. The outer ends of the yard are inserted in sockets formed in metal arms, and in which the yard is free to revolve.

MASTS, SAILS, RIGGING, &c.

The ends of these arms are provided with rings, and the stunsail boom or steadying-sail boom is provided with blocks are linked to branches projecting from the mast-arms, through which chain or rope haulyards are passed, the end of which is attached to the yard arm and the other end is carried through sheaves or blocks in the cross-trees, then through a tackle, and so to the deck. The topsail haulyards are attached to the pearl, and pass up through the masthead, and so to the deck. The lifts are attached to the metal arms, passed through blocks at the masthead, and so to the deck. I fit a rope to the rear of the yard. I can hoist the yard up by the haulyards or lifts to any desired height, or I can leave the yard in any position, whether it be at right angles with or vertical to the mast. The yard passes through blocks which support it as it with the sail revolve in the arms of the yard arm."

[See also Drawing.]

A. D. 1865, January 18.—N° 148.

ANDREW BOLGER.—(*Provisional protection only.*)—
"A method of raising and furling sails."

A boom or spar is attached to the sail midway between its head and its foot. The boom extends from one side of the mast to the other, and its ends project beyond the side of the mast. From each of these projecting ends a chain is attached, and some turns of the chain are wound around the ends; the chains are then led up through blocks at the ends of the yard, to which the head of the sail is connected, and then there they pass to blocks attached to the mast, and are then led downwards and connected to any suitable hauling tackle; other chains may also be wound around the projecting ends of the boom, which are led downwards and through blocks on the yard to which the foot of the sail is attached, and from thence through blocks on the mast to hauling tackle. In order to reef the sail the halliards of the sail are eased off, and the chains above mentioned are hauled on, causing the boom to rotate, and both parts of the sail, both above and below the boom, are rolled upon it, and this action may be continued until the sail is close up. Should it be intended to furl the sail, the sheets

"are eased off, and the whole of the sail rolled up. The boom will then be close to the yard."

[Printed, &c. No Drawings.]

A.D. 1865, January 25.—N° 210.

STEEL, THOMAS.—"Lowering boats and disengaging them from their tackle."

This invention "has for its object the combination and arrangement of apparatus by means of which boats may be lowered" "simultaneously at both ends, by means of a rope passed from the blocks on each davit, such two ropes being brought together and passed round a cleat." The boat is disengaged "by the simultaneous opening of a connector at each end, caused by the pull of chains of suitable length, which become in a state of tension when the boat has been lowered to the required extent." The connector, is composed of two parts, one of which is a link suspended from the usual blocks of each davit, and the other is a second link connected with the former, and from which the boat is suspended at each end by the ordinary slings. The last-mentioned link is formed with a stem extending upwards, and with its upper end inclined inwards, such upper end being confined by a shackle jointed to the upper link of the connector. Then to this shackle is connected one end of the chain, which is fixed at its other end by means of a hook and shackle to the davit; the effect of this arrangement being that while the said chain is loose the shackle of the connector is in a horizontal or nearly horizontal position, and confines the lower link of the connector; but when the chain fixed to the shackle of each connector is brought into a state of tension by the lowering of the boat the shackles are drawn into a vertical or nearly vertical position, and allow the said lower links to fall out of the said shackles, and the boat is thereby at once disengaged simultaneously at both ends. When it is required to raise the boat again the upper ends of the two chains are unhooked from the rings or shackles fixed to the davits, and the stems of the lower links of the two connectors, after being passed through the rings of the ordinary slings of the boat, are inserted in the shackles of the connectors and confined therein."

[Printed, &c. Drawing.]

A.D. 1865, March 28.—N° 873.

GLOVER, TERROT, junior.—(*Provisional protection only.*)—
“Ships’ yards and spars.”

The following is the whole Specification :—

“The object of the invention is to obtain increased strength
“with lightness and elegance of appearance to ships’ yards
“and spars, and the improvements consist in forming them of
“bars of iron or steel of an angular or other suitable section
“combined into the form of the desired yard or spar tapering
“to both or either end as may be desired, and bound together
“by hoops and plates bolted, rivetted, or otherwise fastened,
“so as thereby to form an open framework. By this arrange-
“ment provision is afforded for carrying the studding sail
“booms in the ends of the yards, and housing them in the
“body thereof when not in use, and in a similar manner may
“the booms be carried in other hollow iron yards.”

[Printed, 4d. No Drawings.]

A.D. 1865, March 29.—N° 890.

CHAPLIN, ALEXANDER.—“Apparatus for the instantaneous
“lowering and detaching of ships’ boats.”

This invention relates to improvements upon the apparatus
described in the Specification of N° 443, A.D. 1864.

“Instead of employing a long roller parallel to the ship’s
“rail, around which to coil the ‘davit tackle falls,’ a short
“flanged drum is placed either vertically or horizontally on a
“spindle fixed to the rail about midway between the two
“davits, and the ‘falls’ are passed round guide rollers or
“snatch blocks attached to the davits above the ship’s rail”
and then coiled on the drum, which has a flange in the centre
to prevent the overlapping of the coils. “To one side of
“the drum is fixed a grooved friction wheel, round which
“one or more turns of a rope are taken, one end of this rope
“is made fast to the ship’s rail and the other end is held by
“the person in charge, (whether in the ship or the boat,) and
“on slackening this rope the boat is lowered instantaneously by
“its own weight.” “Balanced disengaging hooks” are
placed “immediately beneath the thwarts, and the eyes or
“rings on the block pass through holes in the latter. The
“form of these hooks is that of a lever bent at an obtuse

" angle, both arms being of about equal length, and the top
 " of the upper arm being formed into a hook, so that when
 " the hooks are placed in the eyes of the blocks the lower arms
 " are held out of the perpendicular position, and these levers
 " are so weighted or balanced that their constant tendency is
 " for the lower arms to fall into the perpendicular position,
 " and hence to withdraw the hooks from the eyes." The
 lower ends of these levers are connected by a rod running along
 " just above the keel of the boat, so that the action of the two
 " hooks must of necessity be simultaneous." When the boat
 is lowered by slacking the friction rope, and she reaches the
 water, the weight is taken off the tackle, " both hooks simul-
 " taneously fall out of their respective eyes, and the boat is
 " instantaneously cast loose."

[Printed, 8d. Drawing.]

A.D. 1865, April 15.—N^o 1067.

FISHER, CHARLES ROBINSON.—Connecting gaffs to masts.

The jaws of the gaff are pivotted to a ring which slides up and down the mast, instead of coming directly against the mast. Friction rollers may be arranged on the ring to ease it when sliding on the mast.

[Printed, 8d. Drawing.]

A.D. 1865, April 27.—N^o 1179.

HARVEY, SAMUEL.—Shaping masts, spars, &c.

The inventor describes the apparatus in the following words :

—" Upon a frame or bed I mount a horizontal cylinder, made
 " to rotate upon its axis by a worm in gear with teeth on the
 " cylinder or otherwise. One end of this cylinder is flanged,
 " and the flange carries six or other convenient number of
 " lugs to receive pins, on each of which a lever is free to turn
 " in order that the levers may approach nearer to or recede
 " from the centre of the cylinder, according to the diameter of
 " the mast or other article to be formed. The inner ends of
 " levers carry horizontal spindles on which loose pulleys are
 " mounted ; some of these spindles, by preference four, carry
 " circular saws secured to the pulleys, while on each of the
 " other two spindles flying cutters are mounted. The pulleys,
 " saws, and cutters are driven by bands or otherwise, and
 " another band passes round all the pulleys or spindles to

“ keep the saws and cutters to their work. On each spindle I
 “ cast a groove or grooved wheel to receive a plummer block
 “ which carries a guide roller, the distance of which from the
 “ spindle can be regulated by screws and nuts, or otherwise.
 “ On the end of the timber to be shaped I fit a template
 “ corresponding to the form of the mast or other article to be
 “ produced; I mount this timber on a travelling platform,
 “ and bring the end carrying the template to the end of the
 “ cylinder on which the saws and cutters are fitted; I then
 “ bring the guide rollers against the template while the saws
 “ approach it, so as almost to touch it, and as the timber is
 “ caused to advance in the cylinder the first saw forms a spiral
 “ cut thereon, then the other three saws successively act upon
 “ the timber in a similar manner; next the flying cutters cut
 “ or clear off the wood remaining between the spirals formed
 “ by the saws, so that this portion of the timber is cut to the
 “ shape and taper of the template; this portion of the timber
 “ acts as the template to the next section of the timber, and so
 “ on until the whole length of timber is cut to the required
 “ shape. Where shells or enlargements are required, as in
 “ ships’ yards, I cause the saws and cutters to recede from and
 “ again approach the timber at the proper time. I prefer to
 “ accomplish this by making the guide rollers approach nearer
 “ to each other, and then again recede.”

[Printed, 10*d.* Drawing.]

A.D. 1865, June 21.—N° 1670.

RICKMAN, WILLIAM CHARLES.—(*Provisional protection only.*)—“Rigging of sailing boats.”

The sail is to be set “in such a position that a line drawn on
 “ a vertical plane from the centre of lateral resistance of the
 “ vessel to the centre of action of the sail will be perpendicular
 “ to the sail.”

The improvements are specially applicable to double boats.
 One of these is smaller than the other, and the two are braced
 together by a platform on which a turntable is mounted. On
 the turntable is pivotted a mast so that it can be inclined over
 the smaller boat. The mast is secured by stays and a crutch.
 On the mast is “a great square sail, the lower yard of which
 “ can be” “boomed out from the mast by two booms passing
 “ from the mast to the yard, and towards the opposite ends

"thereof." To the upper yard are two halliards "one between the centre and the end of the yard on each side and then passing to the mast and down to the turntable." Both of these "may be used in setting the sail up taut, but in proportion as the fore halliard is hauled taut the after halliard is slackened off" so that the sail is "converted from a sail of the principal of a square sail into one of the lug sail principal." This improvement is applicable to all square sails.

[Printed, 4d. No Drawings.]

A.D. 1865, July 3.—N° 1755.

DEANE, EDWARD.—(*Provisional protection only.*)—"Tubular structures."

Amongst other purposes, the method of construction is applicable to masts. In the centre of a tube is fixed a core from which stays radiate to the sides of the tube. Or a number of smaller tubes may be substituted for or used along with the core. The construction preferred is to have three or more "upright stay plates," one of which is placed as a diameter of the tube and the others are fastened radially therefrom by angle plates and bolts. The outer part of the tube is composed of segmental pieces with flanges, to which the "stay plates" are bolted. In men-of-war "step pieces" are fitted so that men may mount inside the masts, and loop holes are made for sharpshooters.

[Printed, 4d. No Drawings.]

A.D. 1865, August 5.—N° 2041.

SIMPSON, CORTLAND HERBERT.—"Apparatus for sustaining and lowering ships' boats."

The apparatus consists, in the first place, of three arms mounted on a common axle, and so connected as to form a kind of frame, the axes being close to the ship's side, and the frame being capable of turning on this axle in such a manner as to assume either a vertical or horizontal position. From the outer corners of the frame "stay chains" proceed to ring bolts in the side of the vessel. When the boat is not in use, it is drawn close up to the middle portions of these outer arms by chain slings, leading to each end and across the boat,

M.

P.

and all united in a single ring in the middle of the latter, one part of these chain slings passing down to the keel of the boat, where it is made fast, this part of the slings being capable of sustaining "for the most part" the weight of the boat. From the single ring mentioned above a short chain is led, having another ring to place upon a spur or hook formed on the middle arm of the frame, and in the first-named ring is also a second ring, into which is inserted the hooks of the tackle by which the boat is hoisted up to the frame, this tackle consisting of a main rope or chain led over the same arm, and passed to the lower of a pair of blocks suitably arranged on board the vessel, the same arm of the frame also carrying other sheaves, over which lines are passed to the "stay chains" named above, these lines serving both to steady the boat and also as "life lines."

The effect of these arrangements is that the boat is drawn up to the frame, and the frame itself raised from the horizontal to the vertical position, when it is requisite to ship the boat, by the use of one single purchase only, the slackening of this purchase, on the other hand, serving both to lower the frame when it is necessary to use the boat, and also to let down to the latter to the water, when the ring slips from the hook supporting it and the boat is set free. A pall or stop is used to regulate the position of the frame when raised.

[Printed, 10d. Drawing.]

A.D. 1865, October 28.—N° 2777.

MURRAY, JAMES, and WELLS, CHARLES. — (*Provisional protection only.*)—Attaching sails to stays, yards, &c.

"An improved clip which is of metal, for attaching the staysails to the stays consists of a pair of jaws jointed together at one end, each of which jaws is formed of semi-circular form, so that when closed they form a circular collar or zone encompassing the stay. On the outer end of these semicircles is formed a bulb or half-neck, which receives a transverse thumbscrew for binding the jaws together, and on the outer end of which bulbs are formed semicircular or nearly semicircular grips which take hold of the bolt rope of the sail. These jaws at the outer ends are sufficiently apart to allow the canvas of the sail to lie between them.

"In applying the invention to, say, square sails, a piece of metal is perforated with a hole to receive the rod on the yard, the outer end of which piece of metal is formed with a hook to receive the bolt rope when it is closed by a swivelling cover rivetted on the back of the clip.

"In applying this invention to fore and aft sails a pair of double hooks is used, which, when laid together, form a broken circle at each end, the two pieces being bound together by a thumbscrew passing through the two pieces of metal in the centre, a throat being formed to receive the screw, and a fixed stud to prevent the two pieces of metal turning on each other. One of the jaws encompasses a bulb iron attached to the back of the mast, and the other the bolt rope on the leach of the sail, or in lieu of the last-described arrangement a double hook may be used, to which is rivetted a swivelling cover or side piece having its fulcrum between the two hooks for partially closing the openings of the hooks."

[Printed, 4d. No Drawings.]

A.D. 1865, November 25.—N° 3031.

FERRIER, JOHN.—(*Provisional protection only.*)—Constructing and propelling vessels.

The object of the invention is to construct a navigable vessel that may be used as a graving dock. The first and third parts relate to the construction and propelling of such a vessel.

The second part "consists in the use of iron or steel tubes set up in the form of shrouds except that they are arched at the top and attached to a strong arched tension bar, which is also formed of a metal tube or of plate iron, which tension bar is securely made fast to the pontoons forming the stem and stern of the vessel. The courses or lower sails are suspended from the fore and aft tension bar in any convenient position." "The top masts are fitted into sockets" formed on the "tension bar" "which may be fitted with tops, crosstrees, shrouds, and sails in the usual manner."

[Printed, 4d. No Drawings.]

A.D. 1865, November 27.—N° 3039.

MANIFOLD, JOHN.—(*Provisional protection only.*)—"Construction of ships' parrels."

The following is all the Specification :—

"The inner part of a ships' parrel constructed according to my invention is provided with a number of rollers or pullies to act as the bearing surface or surfaces ; by their the said rollers or pullies use. When properly disposed the parrel and the parts thereto connected can be moved by the application of a minimum power at an uniform speed.

"In practice the parrel for, say, a topsail yard, consists of a band of the ordinary form, with vertical pieces secured thereto at suitable distance apart on its surface. These vertical pieces carry or support horizontal shafts or pins on or with which the rollers or pullies are free to rotate. With two rings, as it were, of these rollers or pullies, the one above and of the same diameter as the other, only the said rollers or pullies come into contact with the mast ; this allows the desired movements to be made steadily and with celerity."

[Printed, 4d. No Drawings.]

A.D. 1865, December 22.—N° 3314.

DEANE, EDWARD.—Tubular structures.

Amongst the applications of the invention masts are mentioned. These are made of suitable metal with a web or webs of the same metal in the interior rivetted to the sides. Or there may be a central core with radiating plates, or several cores and sets of plates or stays. The mast, &c. may be encased in wood by any suitable method. The mast may be used as a ventilating shaft. Steps may be made therein. Yards may be made in the same way. They may be strengthened within by T-irons and may be covered with wood hooped on them.

[Printed, 10d. Drawing.]

A.D. 1865, December 23.—N° 3334.

HURN, GEORGE, and HURN, DANIEL.—"Obtaining and employing continuous lengths of tanned leather."

Amongst the very numerous applications of the leather thus prepared it is stated that it may be used for "standing and running rigging, warps, cables, and haultards for ships and boats," also for "canvass sails for mills, ships, and boats."

The following is the description given:—"Having selected the prepared skin or hide, and pared or rounded off the edges or corners, the continuous lengths are cut therefrom by causing the knife or instrument to traverse the entire surface of the skin, so as to divide in an endless piece or coil, which is subsequently submitted to a longitudinal stretching, damping, greasing, or hammering, as may be found necessary." The process may be effected by any suitable machinery.

[Printed, 8d. Drawing.]

1866.

A.D. 1866, January 26.—N° 259.

AMBROSE, EDWARD, and BRADDON, WILLIAM.—"Lowering boats."

An "upper beam or stretcher" is fitted to extend from one davit to the other, and a lower beam is suspended from the upper one by a rope. In this lower beam are fixed three drop hooks, from which the boat is suspended. These hooks are connected together by "a trigger, line, chain, or rod," "so as to admit of their being simultaneously opened by pulling a line passed over sheaves or a rod connected to bell cranks fitted to the lower beam or stretcher, and thereby disengaging the boat." The boat can be lowered "by means of two ropes passed over sheaves in the upper and lower beams, thence passed over cleats or sheaves in the lower beam, and wound on to pulleys or drums mounted in the lower beam." The apparatus for regulating and controlling the lowering of the boat, consists of "an endless chain passed over a grooved pulley with projections on it, such endless chain being also, if required, passed round a cleat fixed to the lower beam." A check or holder consisting of a spring fixed at the lower part to the reel or cleat, or fixed part over which the rope

" is passed, with a space at the upper part of the spring in
 " which the rope may be confined, is employed to hold the
 " boat up in its position after it has been raised, while the
 " loose ropes are being wound on to the pulleys or drums.
 " This check or holder is also used to support the boat by
 " holding the endless chain." " If preferred the upper beam
 " above described may be dispensed with, and the sheaves
 " connected to the chain or rope that is ordinarily passed
 " from one davit to the other."

[Printed, 8d. Drawing.]

A.D. 1866, January 29.—N° 285.

CLARK, WILLIAM.—(*A communication from Samuel Brown and Leon Level.*)—" Disengaging eye for launching boats
 " from the sides of ships and for other purposes."

" This invention consists in furnishing an eye which, while
 " forming a perfectly secure connection, may when necessary
 " instantaneously be disengaged." The eye is opened by
 pulling down a lever which raises a slide. In the applica-
 tion of the invention to a boat the hooks of the blocks are
 fitted into such eyes, which are closed, and the levers have
 cords or chains attached to them, which pass under rollers
 at the bottom of the boat, and have their inner ends con-
 nected to a ring. On drawing up this ring the levers will
 be caused to open the eyes " at both ends of the boat simul-
 " taneously, so that the boat will be disengaged at once at
 " both ends and drop horizontally down on the water." The
 ends of the levers may be loaded, or have weights attached,
 in order to keep the jaws in a closed state.

[Printed, 1s. Drawings.]

A.D. 1866, February 10.—N° 420.

DAVIDSON, JONATHAN.—Reefing sails.

The object is to make the sails automatically reef themselves
 by means of the pressure of the wind.

" The yards to which the sail is fixed are made capable of
 " revolving, and a coiled spring or springs, or other suitable
 " means for producing rotation of the yards is or are applied
 " to them to counteract the pressure of the wind. A fusee
 " wheel or wheels is or are applied to each of the yards, and a
 " rope or chain wound round them, and the barrel or barrels

“ containing the spring or springs in a manner similar to the
 “ chain on the fusee wheel and spring barrel of a watch.
 “ When the wind increases in pressure it acts in consequence
 “ more forcibly on the sails, and in tending to draw them out
 “ of their flat form one of the yards is caused to revolve by
 “ the tension thus produced on the chains or ropes, which
 “ action being communicated to the other yard by means of
 “ the fusees and chains or ropes at their ends or central parts,
 “ causes the other yard also to rotate and wind up a portion of
 “ the sail, the tension of the coiled spring being counteracted
 “ by the pressure of the wind against the sails, so that when
 “ the pressure of the wind again diminishes the spring un-
 “ winds the yard, and an increased area of sail is presented
 “ for the wind to act against.”

Several modifications are described.

1. The lower yard of the sail is made to wind the sail upon it. On its ends are fitted pinions, each on which takes into a rack fitted on a framework projecting from the mast. Parallel with the yard there is fitted on the framework a roller, at the centre of which is a weighted wheel. On the ends of the roller are barrels on which are wound chains the ends of which are attached to the yard. Above the spar which forms the upper yard is a spar fixed to the mast on the ends of which are barrels; endless chains pass over these barrels and over others on the rolling yard below. From the ends also of this, upper tubes or bars are stretched down to the ends of the roller below behind the yard. It is stated that by this apparatus the sail, as it is blown out by the wind, will be taken in by the action of the pinions on the end of the yard engaging in the rack, and of the weight behind.

2. A similar arrangement is employed with a coiled spring instead of the weight.

3. Instead of a rack a chain carried on a frame and coiled round a drum on the end of the rolling yard is used.

4. A flat “lever spring” is used instead of a coiled spring.

5. The reefing arrangement is placed at the head instead of the foot of the sail, the rolling yard being still kept at the bottom.

6. A stiff bar hinged to the mast and acted on by a spring, is used “for counteracting the wind pressure on the sail.”

7, 8, 9. These are all different combinations of the parts above described.

10. A cord round the sail roller is attached to the piston of an air-tight cylinder. When the wind acts upon the sail, the air is compressed, and on the pressure ceasing, it expands and draws back the roller.

11. An india-rubber ring "is applied as the counteracting medium," at the bottom of the sail.

12. A similar ring is applied at the top.

13. The sail is made in two pieces, separated down the centre "and the inner corner of each half are hinged at their upper and lower ends to projections on the mast rings." At the outer lower corner of each part of the sail is a line passed over a pulley and carrying a weight. The pressure of the wind causes the sails to yield, and the weight brings them back again. A similar arrangement may be made with a sail "swivelled" on the mast so that more of the sail is on one side than on the other. The pressure of the wind on the side offering the larger area causes the sail to yield. A weight as before brings the sail into position again. "The balancing power may be placed in or upon a moveable post," &c. and a "cord led therefrom to the sails" so that the arrangement can be adapted to the different directions of the wind.

14. In the first arrangement shewn, the barrels at the ends of the roller are brought nearer the centre thereof and an additional bar is fixed across parallel with the roller.

[Printed, 4s. Drawings.]

A.D. 1866, February 16.—N° 494.

DAVIDSON, WILLIAM. — (*Provisional protection only.*)—
"Square-topsails and top-gallant sails."

The invention consists of an arrangement for reefing square top-sails and royals from the deck, and can be applied to the sails "as at present constructed." "An additional leach rope is fitted on each side of the sail, which extends in an oblique direction from the clue to the head of the centre of the sail, which is at that point attached to the yard," or to the mast. "The upper corners or earings of the sail are drawn out to the yard arms when the sail is fully set by outhawls running through blocks or sheaves on the yard arm." "To each of the upper corners or earings of the sail are attached downhaws" "which are reeved through thimbles, or through blocks on the foreside of the sail at

“ the points where the upper corners of the sail would fall
 “ when folded down on the front thereof.” The sail is laced
 or otherwise made fast to the yard. The sail is reefed by
 cutting away the lacings, “ letting go one of the outhauls and
 “ drawing the upper corner of the sail down on to the front
 “ thereof by means of the downhaul passing through the
 “ thimble in the sail from the front to the back thereof, or
 “ through a block on the front of the sail where it is led down
 “ to the deck. When close reefed the other corner or earing
 “ of the sail is loosed and brought down by the downhaul in
 “ the same way, thus leaving the sail in the form of a triangle,
 “ the extra leach ropes then forming the edge of the sail.
 “ In place of the single downhaul described, blocks may be
 “ attached to the upper corners or earings of the sail at the
 “ point required, one end of the rope being made fast to the
 “ bolt rope on the foot of the sail at, say, about one-third of
 “ its length from the yard, when it is carried in an oblique
 “ direction through the double block on the front of the sail,
 “ and thence through a block on the upper corner of the sail,
 “ and thence back again through the double block on front
 “ of the sail, and down on to the deck, thus forming a clue-
 “ line and downhaul, both sides of the sail being fitted in the
 “ same.”

[Printed, 4d. No Drawings.]

A.D. 1866, March 24.—N° 876.

MEDHURST, JOHN.—“ Reefing and furling sails.”

The foot of the sail is attached to a roller at each end of which
 is a spindle fitting into an eye in a short rod. On the lower
 yard are sockets into which these rods fit. There may also be
 crutches on the lower yard in which the roller rests.

“ Near each end of the roller is a pulley or barrels, around
 “ which a chain passes, the end of which descends to the deck,
 “ and the two ends of the chains in passing from the pullies
 “ or barrels to the deck pass through holes formed near the
 “ end of the lower yard, in which holes there are sheaves
 “ against which the chain rests; each chain then passes over
 “ the sheaves in a block or blocks, and descends to the deck.
 “ Hence when it is desired to reef the sail the roller is rapidly
 “ caused to rotate by the two chains, which are respectively on
 “ the two pullies or barrels on the two ends of the rollers, the

“upper yard to which the upper part of the sail is bent or attached being at the same time lowered till it comes to the cap. When it is desired to furl the sail the remainder of the rolling up of the sail on the roller is accomplished by means of two parbuckle lines or ropes, one end of each of which is attached to the upper yard, and then descends and is passed under the roller; it is then carried up again to the upper yard, is passed through a block affixed to the upper yard, and then descends to the deck.” By hauling on these lines the lower yard is caused to ascend at the same time as the roller revolves. To prevent the sail chafing against the stay, a “frame of small rollers” is fitted to the stay so as to keep the sail off it.

[Printed, 8d. Drawing.]

A.D. 1866, April 5.—N° 970.

ALLIX, GEORGE.—Reefing and furling sails.

Partly improvements on No. 2399, A.D. 1864.

For reefing courses the yard is supported at the centre by a double claw fitted with rollers within which the yard may revolve. At each end of the yard is fitted a short metal arm or stay, forked or not, in a socket at the end of which a pin in the end of the yard fits. A hoop which encircles the end of the yard is also affixed to this stay. It carries pulleys through which a reefing-chain is led to the yard-arm, on which it is coiled. The chain is then carried through blocks on the mast to the deck. The sail is reefed by hauling on these chains so as to revolve the yard and wind the sail thereon. It is set by slacking the chains and hauling on the sheets.

For top-sails a similar arrangement is fitted on each yard, but the two reefing chains are joined into one, and their end hangs down along the mast. On it is a block to which the end of the top-sail tie is made fast. The tie passes over the block in the mast and through a block on the claws at the end of the yard to hoist the sail. Or the reefing chains may have a separate tackle. The ends of the yard on which the chains are wound are smaller than the rest of the yard, to prevent the sail from being slack. A chafing-spar is affixed to the yard in hoops on the bearings on the yard-arms and on the claw or otherwise.

A parrel is formed of two hoops round the mast, connected by a cross-piece. The hoops are each in two pieces connected by screws, so that they can be removed from the mast.

The fittings on the yard-arms may be adapted to the booms of fore-and-aft sails.

[Printed, 10d. Drawings.]

A.D. 1866, April 17.—N^o 1081.

MAY, EDMUND REYNOLDS.—(*Provisional protection only.*)—Lowering and disengaging boats.

The gripe is passed over a tumbler “hinged freely to a stud by a pin through its lower end.” The upper end is secured “by a disc fixed to a spindle and revolving in a socket.” “This socket and the tumbler stud are fixed to a plate which is bolted outside the ship.” The edge of the disc “is notched to correspond with a groove” in “the side of the socket next to the tumbler, and the spindle passes through the socket to the inside of the ship; to its inner end is fixed a lever by which the disc is turned. To fix the gripe the disc is turned until its notch corresponds with that in the socket; the tumbler, on which is placed the eye or hook of the gripe, is then raised, its upper end placed in the socket notch, and the disc turned notch upwards.” When the boat is to be disengaged, the disc is turned notch downwards and the gripe thus let go. If two gripe are used, the two levers are worked simultaneously by a third.

The pendants pass “from a barrel placed midway between the davits” to sheaves on the davit heads. The disengaging block for the pendants is similar to that used for the gripe. The barrel has a friction strap and a winch by which the pendants are wound upon it. “The disengaging block is of metal with a score in its lower end extending about half way up the block, thus leaving two cheeks or lugs. Through the upper or solid end of this block is passed a spindle having on one end a notched disc” and on the other “a grooved wheel, which has a pin fixed in one part of its periphery. To one of the cheeks is fitted a bent tumbler moving freely on a pin; the other cheek is slotted up as far as the notch in the disc, and the bent end of the tumbler is passed up this slot, and

" held there by the disc being turned with its notch upwards.
 " To an eye in the upper end of each block is shackled the
 " lowering pendant. The boat is fitted with slings in the
 " usual manner, and to the slings are attached hooks having
 " catch stops in them to prevent unhooking. A small barrel
 " worked by a lever is fitted underneath the midship thwart,
 " from which a line passes to each end of the boat through a
 " guide pulley fixed to the bottom of the boat under the
 " hooks in the slings; the ends of these lines are fitted
 " with eyes which pass over the pin in the grooved wheel
 " of the block when the boat is hooked on to the tumbler.
 " The boat is hoisted up to the davits by the usual tackles,
 " one hook in each sling being hooked to an eye in the lower
 " tackle block. The pendants having been previously wound
 " up, the other hook in the slings is hooked on the tumbler
 " of the disengaging block, the line from the boat is passed
 " over the pin in the grooved wheel of each block, the tackle
 " block unhooked, and all is ready for lowering. By moving
 " the barrel lever in the boat the lines are pulled upon and
 " the discs in the blocks turned with their notches downwards,
 " when their tumblers fall down, the hooks slip off them, the
 " lines at the same time slipping off the pins in the wheels;
 " the boat is thus instantly free from the ship."

[Printed, 4d. No Drawings.]

A.D. 1866, May 2.—N° 1247.

RAMSTEN, CARL HENDRIK. — "Lowering and releasing
 " ships' boats."

Disengaging hooks are used, each of which is composed of
 " a short piece of metal having an eye at each end " and " two
 " other parts which are pin-jointed to each other, and the
 " end of one of them is pin-jointed to the piece of metal;
 " the free end of the other of the two parts folds down against
 " the piece of metal, and its point " is received into a recess
 therein. To secure the hook a small bolt is used which can be
 drawn by a line.

By these hooks the tackle falls are connected to chains each
 of which passes through an eyebolt on the bottom of the boat
 and is secured to one end of a bar at the bottom of the boat,
 the other chain being similarly secured to the other end. The

hook is also fixed to a chain attached to the bottom of the boat on which is a ring for hooking on the tackle to hoist the boat. "When the boat is hanging from the davits it is held " in the ordinary gripes or lashings, the inner end of each of " which is attached to a folding lever which turns on an axis " fixed to the upright of the davit on to which the end or eye " of the gripe is put. This hook is retained in its place by a " folding stop, and is lashed by the fall of the lowering tackle. " The folding lever has an ascending rod attached to it, and a " short chain, the upper end of which is retained by a pin or bolt " near the upper outer end of the davit, and such bolt or pin " is withdrawn by a hook attached to a chain or cord attached " to the boat, so that as the boat commences to descend the " pin or bolt is withdrawn, and the folding lever released, and " consequently the end of the grip also."

[Printed, 8d. Drawing.]

A.D. 1866, May 10.—N° 1347.

THORNTON, THOMAS. — (*A communication from Digby Murray.*)—"Raising and lowering ships' boats."

A combined hook and block of peculiar construction is described. The lower part of the hook is jointed to the shank and has also an arm on it which lies along the shank. The hook is fixed in the centre of a double block, over the sheaves of which the falls pass. The end of the arm on the hook has free play through a slot in the block, so that the end of the hook may turn on its pivot to release a weight hung on it, or may be kept in position by the arm being held alongside of the shank. This is effected by a sliding bolt which is drawn by a lanyard. The lanyard may be secured to the ship's side so that when the boat is lowered, the weight of the boat comes on the lanyard and draws the bolt. Any number of sheaves may be employed, and the bolt may be forked so as to act on both sides of one of them.

[Printed, 8d. Drawing.]

A.D. 1866, May 14.—N° 1372.

GERARD, WILLIAM. — (*Partly a communication from Andrew Gove.*)—"Tight joints around masts and other " projections,"

A metal hood is fixed round the base of the mast and on to the deck. On the deck fitting close round the mast are two rings of india-rubber or other flexible material, and through them the screws pass which fasten down the hood to the deck. This hood is of a conical shape with flanges where it is secured to the deck and the mast. Around the mast under the hood packing may be placed to make a water-tight joint.

[Printed, 8d. Drawing.]

A.D. 1866, May 17.—N° 1400.

CHAPMAN, CHARLES.—Reefing sails.

The courses may be reefed by gathering them in to the mast by lines led horizontally across the sail and secured to the leach ropes. Ropes are also fitted to the earings and led through blocks on the yard arm for hauling the sail in or out.

The foot of the top-sail may be gathered in to the lower yard by a similar arrangement of lines, and the head is rolled on the upper yard "by rotating the said yard by means of " halyards and hauling lines."

[Printed, 10d. Drawings.]

A.D. 1866, June 21.—N° 1659.

FORGIE, WILLIAM, and THORNTON, JOHN.—"Improve-
ments in the construction of life boats and in sails for the
same."

The so-called sail is really a sort of hood "fixed or placed
on to the fore part or stem of the boat, extending round
and above the gunwale to about one-third of the length of
the boat." It "consists of a number of separate air-tight
compartments combined together in the form of a hood."
These compartments may be made of various materials and
filled with "any light buoyant material, by preference
granulated cork."

These boats may be used to carry a line from a stranded vessel to a lee shore.

[Printed, 10d. Drawing.]

A.D. 1866, August 15.—N° 2093.

WHITE, HENRY BURT.—(*Provisional protection only.*)—
"Apparatus for detaching ships' boats."

The apparatus "consists of a rod of metal, by preference galvanized iron, passing from end to end of the bottom of the boat, into which it may be sunk. This rod turns freely on its own axis, whilst it is kept in its place either by means of metal eyes placed at suitable intervals or by bearings bolted to the bottom of the boat. At or near the middle of the rod a lever arm is secured thereto, at the outer end of which arm is formed a slot; this slot passes over a catch, which is fitted to the bottom of the boat at one side, and by this arm and catch the bar is securely held in a given position. The lever arm can at any moment be released from the catch simply by turning the same. At each end of the rod is formed a projection, having a slot or recess formed therein, which slot or recess receives or fits upon a staple or strong metal pin, furnished with an eye, and carried by a separate eye secured to the bottom of the boat. This slot or recess is so placed that, when the lever arm is secured by the catch, the staple or pin is held down and then forms a continuous line with the rod, but when the lever arm is raised and turned over the staple is free to rise from the recess. Round the staples or metal pins, when held down by the recesses at the ends of the rod, are passed hooks or rings attached to the ends of the chains by which the boat is suspended."

[Printed, 4d. No Drawings.]

A.D. 1866, September 3.—N^o 2261.

BONNEVILLE, HENRI ADRIEN.—(*A communication from Thomas Huntington.*)—"Detaching boats from their davits."

The apparatus is attached to the front and rear thwarts of the boat, and is constructed of a metal plate let into each of the thwarts, and firmly bolted in position, and having two upright lugs or ears, between which a bar or hook is secured by a pin, the former being allowed to work or turn freely on the latter. Each hook consists of two arms, at right angles to each other. The short arm, which is horizontal when in use, lies above the thwart. The long arms extend down through holes or openings in the thwart plates, and have shoulders upon the upper edges of their lower ends for arms on a shaft to abut against and keep the upper ends of the hooks in about a horizontal position, and near the upper ends

of projections on the thwart plates. There are two of these shoulders on each plate, one on each side of the hole or opening in the plate. When the hooks are thus secured in position the davit tackle hooks may be fitted under them, so that they cannot be detached, unless the arms above referred to are moved down by turning the shaft on which they are fixed; this shaft is suspended under the thwart, and is turned by pulling up a ring sunk in the upper side of the thwart, which is connected with a lever on the shaft.

The shaft extends from the front to the rear thwart, and both arms are attached to the same shaft, so that both arms will be moved at the same time, or by the same movement of the shaft, and the hooks of both tackle blocks will be liberated at the same time. When the boat is lowered, so that it touches or nearly touches the water, the shaft is turned; both hooks are liberated from the davit tackle hooks, and the boat is set free.

[Printed, 1s. Drawings.]

A.D. 1866, November 9.—N° 2919.

CASSAP, WILLIAM.—“Expediting the putting out of ships’ boats.”

The boat rests on “hinged chocks,” each of which has an “arm or stay” by which it is kept erect. By means of a crank lever on each arm it and the chock to which it is attached can be lowered. Running along by the side of the boat is a rod fitted in sliding bearings. To this rod levers are attached which work the cranked levers above mentioned and so cause the chocks to fall. On the rod are also curved pieces which fit over pins on which the gripes may be hooked, so that as the rod is drawn back these pieces carry the ends of the gripes off the pins, and they fall loose.

Instead of the ordinary davits a pair of horizontal beams are used. Each of these is hollow and has within it a sliding piece from which lugs project through a slot along the under side of the beam. These lugs carry a block over which the falls run. The sliding piece has on it a pall engaging in a rack in the beam so that “if the ship be rolling the boat will “by its own weight be carried out clear over side by pulling “on the sliding piece.” Out-haul tackles are to be used when the ship is not rolling. Any usual method of lowering and disengaging the boat may be used.

The apparatus may be modified to ensure "that the boats shall run out stern and stern evenly." This is to be effected by means of "an arrangement of chains passing over pulleys or guide wheels, and so connected that the pull of the boat or the pull on the tackle is distributed equally over both davits, and that the davits shall advance or run out each to an equal distance." With the same object "the chocks are united by connecting rods."

[Printed, 1s. 4d. Drawings.]

A.D. 1866, November 12.—N° 2952.

MURRAY, DIGBY.—Lowering boats.

This is stated to be an improvement on No. 1347, A.D. 1866.

Rings on the ends of the tackle falls engage with hooks on chain slings attached to the boat fore and aft. The chains from each sling are led along its bottom over blocks to the centre of the boat, where by a lever or catch they can be simultaneously disengaged. The hooks on the slings are attached at their upper parts to short chains fixed to the boat, so that the hooks are capsized as soon as the weight of the boat is thrown on these chains by the letting go of the slings.

The chains of the slings may be separate, or they may form one chain of sufficient length to allow for slack in the middle.

[Printed, 10d. Drawing.]

A.D. 1866, December 7.—N° 3228.

CLARK, WILLIAM.—(*A communication from Samuel Brown and Leon Level.*)—"Detaching hook."

This invention "relates principally to the launching of boats from the sides of vessels, but it may be applied to other purposes. It consists in constructing and operating a peculiar shaped detaching hook, whereby the ends of a boat may be instantly and simultaneously detached by the simple movement of a lever by one man, and the boats safely launched, whether the vessel is at rest or under weigh."

This detaching hook consists essentially of three parts; one of these is a slightly curved piece, and when the boat is suspended from the hook of the ship's tackle this piece rests within such hook, and in fact sustains the weight of the boat. This curved piece is jointed at one end to the upper end of a vertical bar which forms the second part of the arrangement,

and which descends and is jointed to a bar fixed in the bottom of the boat, and while it is necessary that the boat should be suspended from the tackle the curved piece already mentioned is retained in position by a third piece, constituting a bent lever, the fulcrum of which is a stud in the second piece, and the upper end of which is slotted so as to be capable of passing upon the end of the curved piece opposite to that which is jointed to the second piece, and retaining it in position. When it is necessary to release the boat from the tackle; however, this lever is moved so as to disengage the slotted part thereof from the curved piece, and the latter then turns upon the stud which connects it to the vertical bar, and so escapes from the hook of such tackle. An arrangement of this kind may be placed at each end of a boat, and the levers be moved simultaneously so as to disengage both hooks by the employment of a horizontal rod jointed to the lower ends of the levers, and a third lever in connection with the rod which may be acted upon by hand.

[Printed, 1s. Drawings.]

A.D. 1866, December 20.—N° 3357.

LUNGLEY, CHARLES.—“War ships, guns, and armour.”

The patentee describes improvements in iron ships. The portion relating to this series runs as follows :—

“In these ships or forts I fit shot-proof ‘coamings,’ and from these I carry up trunks or masts made self-supporting and diminishing in diameter and thickness to the upper end; in these trunks and masts I fit tubes to be used to get a reverse current of air; I also fit them with ladders and platforms for ‘conning’ for riflemen, and others; these may be made to hinge or lower in part or in whole. When used as a mast I fit the gear so as to work the canvas from the inside when required, and fit half yards or gaffs which are hinged and jointed so as to lower alongside the mast, and fitted on a ring so as to work round the mast; or I also fit other rings round the masts to secure the canvas so that the two sails may make or act as a square sail; the sails are also made so that they may be reefed from the inside of the masts.”

[Printed, 1s. Drawing.]

APPENDIX.

A.D. 1792, June 14.—N° 1890.

SILVESTER, GEORGE.—"Wind and water mills."

A wind-mill is figured and described in a short notice appended to the drawing. On a vertical shaft are corresponding pairs of horizontal radial arms; between each pair of arms is pivotted a flat blade or vane in a vertical position. Each arm has on it, parallel with itself, a shaft, on each end of which is a bevel cog-wheel. Of these, one engages with a fixed bevel wheel concentric with the main central shaft, and the other with a bevel wheel on the axle of the vane. By the action of these the vanes are feathered as they come up against the wind. This mill may be applied "to the working of common boats without oars."

[Printed, 10d. Drawing. See Rolls Chapel Reports, 6th Report, p. 142.]

A.D. 1816, March 14.—N° 3996.

DAWSON, JAMES.—Motive power, and propelling vessels.

The inventor describes a propeller formed of elastic rods of wood or metal, covered with flexible material, cloth, leather, &c. saturated if required with "a solution of caoutchouc." Sails may be made in a similar way. When sails of the ordinary sort are used, they may obtain "a certain degree of elasticity by attaching them to the masts, yards, or ropes, of the intervention of spiral or other springs." The inventor also uses "elastic levers or masts, formed and curving like coach springs, of a suitable size, either solely by themselves or attached to masts of the ordinary kind, and capable of turning as on a center, and of being posited in divers positions." To these sails are attached "in a vertical position, or nearly so."

The propeller above described may be actuated by a wind-mill.

[Printed, 6d. Drawing. See Rolls Chapel Reports, 8th Report, p. 113.]

A.D. 1856, June 3.—N° 1322.

LEVERSON, MONTAGUE RICHARD.—(*A communication.*)—
“Tackle blocks.”

A disengaging hook for lowering ships' boats is described. “The hooks of the lower blocks of each set of tackles are hung upon pivots placed slightly aside from the centre line of the blocks, and are provided with counterbalance weights,” so that when the weight of the boat is taken off the hooks, they turn over and release the boat. “The block is made with a recess between the sheaves to admit the counterbalance, and the sides of the recess are provided with metal cheeks, that strength may be retained.”

[Printed, 8d. Drawing.]

A.D. 1856, November 21.—N° 2755.

NORMAN, JOHN. — (*Provisional protection only.*) — Propelling vessels.

An auxiliary propeller is described. “In order that the submerged propeller may be called into play as little as possible, it is proposed to give her a larger amount of fore-and-aft sail than is now usual in such ship, to accomplish which it is proposed to increase the size and mode of fitting and setting the ‘spanker,’ ‘the fore-and-aft mainsail,’ ‘spencer,’ or ‘trysail,’ and the ‘trysail,’ ‘spencer,’ or ‘fore-and-aft foresail,’ and above which it is proposed to set gaff topsails, the heads of which will extend to the topgallant mast or royal mastheads, to enable a larger ‘fore-and-aft mainsail,’ or ‘main trysail,’ or ‘fore-and-aft foresail,’ or ‘foretrysail,’ to be set. The gaff is fitted to the ‘cap’ or mast head by the well-known ‘goose-neck’ joint, or any other convenient method. The sails are so fitted that they can be hauled in and out upon their gaff, and the ‘fore leech’ of the sail is laced or otherwise secured to the back of the mast or to a ‘jackstay’ fitted abaft the mast. The ‘slings’ for hanging the gaff are to be secured to the ‘hounds’ or top-mast head.”

[Printed, 4d. No Drawings.]

A.D. 1864, September 30.—N° 2405.

VINE, JAMES.—(*Provisional protection only.*)—Propelling vessels.

A method of propelling vessels by means of buoyant "pontoon wheels" is described. The inventor says :—"In addition to the said pontoon wheels, or instead thereof, I use sails made as bags to be inflated with air, buoyant gases, or vapours, the said bags being furnished with air valves so as to permit of the air, buoyant gases, or vapours being removed when the ship or vessel is lying in a port or dock, or when these aforesaid sail bags are not required, and being also furnished with cords, ropes, or other suitable apparatus, whereby they may be lowered so as to be out of the way in a storm, or, when not required, instead of allowing the air, buoyant gases, or vapours to escape, the said sails or bags being secured to the ship or other floating body by cords, ropes, and pulleys, or by other similar or suitable attachment."

[Printed, 4d. No Drawings.]

INDEX OF SUBJECT MATTER.

[The numbers refer to the pages on which the Abridgments commence. The names printed in *Italic* are those of the persons by whom the inventions have been communicated to the Applicants for Letters Patent.]

Balloons used to support sails :

Sager, 49.

Boats, lowering and disengaging :

Cook, 31.
Shores, 32.
Lacon, 57.
Roberts, 58.
Dewy, 60.
Clough, 63.
Lawson, 65.
Clifford, 66.
Matthews, 67.
Russell, 68.
Wymer, 69.
Saxby, 70.
Rixon, 76.
Grignon, 85.
Napier, 91.
Wright, 94.
Newton, 95.
Leverson (*App.*), 244.
Clifford, 96.
Dunbar, 105.
Kynaston, 112.
Gray and Gladstone, 114.
Galloway, 117.
Kynaston, 121.
Davies, 125.
Clifford, 125.
Talbot, 126.
Mortimer, 131.
Perley, 135.
Livingston, 137.
Dando, 138.
Galloway, 142.
Clark, 143.
Wood and Rogers, 144.
Nash, 145.
Wood and Rogers, 146.
Lambert (*Carlton*), 147.
Guthrie, 148.
Jones and Stothard, 148.
Lynch and Tynan, 152.
Payne, 152.
Taylor, 157.

Boats, &c.—*cont.*

Davidson and Ellercamp, 158.
Watson, 166.
Gladstone, 168.
Lord and Gilbert, 174.
Thorne, 184.
Oliver and Myers, 185.
Thorne, 188.
Oliver and Myers, 191.
Gamble, 198.1
Van Wagenen, 198.
Steel, 221.
Chaplin, 222.
Simpson, 225.
Ambrose and Braddon, 229.
Clark (*Brown and Level*), 230.
May, 235.
Ramsten, 236.
Thornton (*Murray*), 237.
White, 238.
Bonneville (*Huntington*), 239.
Cassap, 240.
Murray, 241.
Clark (*Brown and Level*), 241.

Booms, double :

Higgins, 18.

Booms, iron :

Trevithick and Dickinson, 12.
Bill, 15.
Harratt, 178.
Glover, 222.

Booms, iron and timber combined :

M'Gavin, 64.
Moore, 206.

Booms, jaws of :

Ennis, 60.
Brown, 173.

Bowsprit and boom in one piece :

Higgins, 18.

Bowsprit, swung to fore-mast :

Penneck and Dunkin, 7.

Bowsprits, double :

Gifford, 118.

Sharpe, 179.

Bowsprits, heaving in and out :

Spencely, 48.

Webster, 127.

Shulldham, 138.

Russ, 194.

Bowsprits, iron :

Trevithick and Dickinson, 12.

Bill, 15.

Bill, 15.

Borrio, 45.

Finch, 99.

Hodgson, 103.

Bowsprits, iron and timber combined :

Finch, 99.

Bowsprits, making :

Smart, 6.

Seppings, 23.

Atlee, 27.

Roberts, 35.

Buoy, sail for :

Orton, 47.

Canvas for sails. See Sails, fabrics for.

Chain rigging. See Rigging.

Cleats. See Sheets.

Compositions for dressing spars, tackle, sails, &c. :

Beale, 1.

Lewis, 1.

Saunders, 2.

Lussanute, 4.

Hill, 15.

Clark, 104.

Barnwell and Robinson, 137.

Kalston, 172.

Sander, 181.

Courses. See Sails.

Drifts. See Boats, lowering.

Dead-eyes. See also Rigging :

Clarke, 26.

Chatten, 44.

Christophers, 50.

Fuller, 153.

Clark (*Ricketson*), 181.

Elastic rigging. See Rigging, applying springs to.

Electrical conductors. See Lightning.

Fair-leaders :

Moore, 176.

Fids. See also Masts, top :

Rotch, 16.

Kingston and King, 23.

Seppings, 25.

Rotch, 26.

Brooking, 28.

Prior, 29.

De la Garde, 29.

Pearce, Gardner, and Gard-

ner, 32.

Blake, 34.

Poole, 45.

Maccarthy, 48.

Dyer, 122.

Fore-and-aft sails. See Sails.

Fore-sails. See Sails.

Furling Sails. See Sails.

Gaffs, double :

Gifford, 118.

Gaffs, jaws of :

Ennis, 60.

Rowett, 84.

Gifford, 118.

Dyer, 122.

Brown, 173.

Fisher, 223.

Gaffs, jointed :

Lungley, 342.

"Gaff-yards" :

Gifford, 118.

Glass terminals for masts :

Newton, 49.

Hooks, detaching. See Boats, lowering.

Hooks, spring :

Baham, 203.

Hoops for masts. See Masts.

Jackstays. *See* Sails, bending on yards, and Sails square, reefing.

Jib-booms :

Higgins, 18.
Gifford, 118.
Shuldham, 138.

Jibs. *See* Sails.

Kites used as sails :

Viney and Pocock, 25.
Cordner, 140.

Lightning conductors :

Brown, 11.
Harris, 67.

Lug-sails. *See* Sails.

Main-sails for cutters, &c. *See* Sails.

Masts, coaks for :

Atlee, 19.

Masts, enabling to be started overboard :

Finch and Lampport, 72.
Prideaux, 148.

Masts formed of four spars :

Shuldham, 20.
Christophers, 50.

Masts, giving elasticity to :

Dawson (*App.*), 243.
Finch and Lampport, 72.
Robertson, 133.
Symes, 199.

Masts hollow, utilising interior space of :

Bill, 15.
Simons, 129.
Jordan, 135.
Moore, 205.
Deane, 225.
Deane, 228.
Lungley, 242.

Masts, hoops for :

Atlee, 27.
Dyer, 106.
Simons, 165.
Simons, 168.

Masts, iron :

Trevithick and Dickinson, 12.
Bill, 15.
Bill, 15.
Borrie, 45.

Masts, iron—*cont.*

Scott, 55.
Finch and Lampport, 72.
Clare, 73.
James, 77.
Stephen and Pirnie, 80.
Newman and Whittle, 90.
Hodgson, 105.
Cato and Betteley, 107.
Hebson, 123.
Jordan, 135.
Prideaux, 148.
Simons, 149.
De Boussois, 154.
Selby, 164.
Simons, 165.
Simons, 168.
Leigh, 170.
Coles, 177.
Harratt, 178.
Harratt, 182.
Dowson, 189.
Jürgens, 192.
Elwell, 196.
Turnbull, 201.
Todd, 209.
Panton and Panton, 217.
Deane, 225.
Deane, 228.

Masts, iron and timber combined :

Mc Gavin, 64.
Getty, 70.
Clare, 73.
Chubb, 82.
Robb and Hill, 84.
Gladstone, 91.
Finch, 99.
Brown, 103.
Cato and Betteley, 107.
Sharpe, 179.
Deane, 228.

Masts, jointed, hinged, or pivotted :

Dawson (*App.*), 243.
Shuldham, 20.
Higgins, 37.
Beadon, 44.
Macintosh, 56.
Brims, 71.
Finch and Lampport, 72.
Prideaux, 148.
Jordeson, 154.
Silver and Moore, 168.
Symes, 199.
Rickman, 224.

Masts, lowering below deck :

Dunn, 176.

Masts, making junction of with deck water-tight :

Gerard (Gove), 231.

Masts, setting up

Roberts, 58.

Masts, shears used as :

Eccles, 14.
Higgins, 18.
Guppy, 19.
Shuldham, 20.
Higgins, 24.

Masts, swivelling :

Leigh, 170.
Jurgens, 192.

Masts, telescopic :

Smart, 6.
Trevithick, 12.
Borrie, 45.
Aldborough, 78.
Coles, 177.
Sharpe, 179.
Cook and Terry, 183.
Kennedy, 193.
Russ, 194.

Masts, top, setting up. See also Fids :

Gower, 5.
Smart, 6.
Penneck and Dunkin, 7.
Guppy, 19.
Shuldham, 21.
Borrie, 45.
Christophers, 50.
Finch and Lamport, 72.
Smith and Irvine, 101.
Cole, 111.
Gifford, 118.
Dyer, 123.
Simons, 129.
Shuldham, 138.
Vandercruyce, 161.
Clark, 179.
Cunningham, 181.
Turnbull, 201.
Congalton, 217.
Ferrier, 227.

Masts, treating timber for :

Atlee, 27.
Boucherie, 89.
Cowper (*Boucherie*), 93.
Ferguson, 101.

Masts, wooden, making :

Smart, 6.
Wilson, 11.
Atlee, 19.
Seppings, 23.
Ferguson and Atlee, 26.
Hillman, 27.
Green, 28.
Roberts, 35.
Day, 39.

Masts, wooden—cont.

Poole, 41.
Jeffery, 42.
Goodwin, 46.
Christophers, 50.
Perkes, 61.
Webster, 127.
Johnson (*Niles*), 140.
Harvey, 223.

Nippers for attaching blocks, &c. to ropes :Newton (*Allen and Bentley*), 152.**Parrals. See also Yards, and Sails, reefing :**

Stocks, 75.
Cole, 111.
Shibles, 115.
Dyer, 123.
Cunningham, 152.
Collins, 169.
Fergus, 210.
Gandy, 211.
Manifold, 228.

Reefing sails. See Sails.**Rig, special sorts of :**

Gower, 5.
Cowan, 10.
Doncaster, 13.
Eccles, 14.
Guppy, 19.
Shuldham, 20.
Higgins, 24.
De la Garde, 29.
Stollmeyer, 41.
Christophers, 50.
Brims, 71.
Evans, 80.
Lewis, 84.
Parkhurst, 92.
Norman (*App.*), 244.
Cunningham, 141.
Cunningham, 164.
Leigh, 170.
Cunningham, 181.
Harratt, 182.
Kennedy, 193.
Symes, 199.
Rickman, 224.

Rigging, applying springs to :

Burnett, 19.
Heathorn, 33.
Adams and Buchanan, 39.
Poole, 41.
Newall, 49.
Colegrave, 52.
Fuller, 78.
Betteley, 81.
Eatou, 108.

Rigging, running, of endless line :

Cunningham, 209.

Rigging, setting up. See also Dead-eyes.

Rogers, 16.
Huntley, 33.
Newton, 40.
Greer, 43.
Poole, 45.
Newall, 49.
Chapman, 53.
Long, 66.
Newall, 75.
Finch, 99.
Dyer, 106.
Dyer, 122.
Thompson, 155.
Russ, 194.

Rigging, standing. See Shrouds and stays :

Rigging, wire, chain, &c. :

Slater, 8.
Brown, 11.
Bill, 15.
Smith, 35.
Smith, 38.
Puis, 62.
Newall, 86.
Dyer, 106.
Absterdam, 115.
Jordan, 135.
Morgan, Jay, Edwards, and Tilston, 165.
Walker, 171.

Sail-hanks :

Brooman, 62.
Dyer, 106.
Dyer, 122.
Balans, 203.
Murray and Wells, 220.

Sail, hood-shaped :

Forge and Thornton, 238.

Sails, arrangement of cloths in :

Cowan, 10.
Heathcote, 17.
Shuldham, 20.
Brooking, 28.
Ramsay, Ramsay, and Orr, 31.
Gilbert, 46.
Brown, 47.
Norman, 62.
Summers, 63.
Cole, 110.
Clark (*Bonnet*), 163.
Hewitt, 202.

Sails, bag-shaped :

Vine (*App.*), .

Sails, bending on yards, &c. :

Delolme, 3.
Lonsdale, 4.
Dawson (*App.*), 243.
Dodge, 74.
Stocks, 75.
Fox, 122.
Lewis, 137.
Galloway, 143.
Clark (*Ricketson*), 179.
Murray and Wells, 226.

Sails, fabrics for :

Dempster, 8.
Scarfb, 9.
Campion, 13.
Ramsay, Ramsay, and Orr, 31.
Taylor, 33.
Barré, 41.
Ayre, 47.
De Wardin, 52.
Newton, 54.
Taylor, 53.
Fanshawe, 59.
Armitage, 88.
Fillier, 89.
Gifford, 118.
Beardon, 131.
Henson and Henson, 154.
Chalmers, 166.
Chalmers, 172.
Harrington, Hewetson, and Hewetson, 212.
Bruce, 214.

Sails, fore-and-aft, reefing :

Eccles, 14.
Higgins, 18.
Higgins, 21.
Winspear, 43.
Dodge, 74.
Cavanah, 77.
Lenox, 79.
Rowett, 86.
Cunningham, 88.
Dyer, 93.
Dyer, 96.
Dyer, 122.
Clark (*Mulliner*), 144.
Turpin, 147.
Lynch and Tynan, 152.
Scott, 159.
Campbell and Kendal, 160.
Watson, 169.
Hart, 206.
Hart, 216.
Butchart, Stroud, and Morrison, 219.

Sails, joining seams in with india-rubber :

Fanshawe, 59.

Sails, latteen :

Shuldham, 20.
Moore, 179.

Sails, leaches of, flat ropes for :

Dyer, 93.
Phalps, 204.

Sails, leather :

Dawson (*App.*), 243.
Hurn and Hurn, 228.

Sails, machine for joining seams of :

Waller 142.

Sails made of wood or metal :

Perkes, 61.
Trevithick, 134.
Leigh, 170.

Sails, openings in to allow passage of wind :

Fanshawe, 59.

Sails, particular descriptions of :**Courser :**

Delolme, 3.
Gower, 5.
Penneck and Dunkin, 7.
Christophers, 50.
Gifford, 118.
Galloway, 142.
Moore, 159.
Clark, 163.
Clark (*Ricketson*), 179.

Fore-sails :

Gower, 5.
Penneck and Dunkin, 7.

Fore-and-aft sails :

Penneck and Dunkin, 7.
Higgins, 18.
Shuldham, 20.
Higgins, 24.
Munnings, 68.
Rowett, 86.
Dyer, 122.
Cunningham, 141.
Lynch and Tynan, 152.

Jibs :

Higgins, 18.
Shuldham, 20.
Macintosh, 56.
Rowett, 86.
Dyer, 108.
Balans, 208.

Log-sails :

Penneck and Dunkin, 7.
Shuldham, 20.
Higgins, 24.
Ricketson, 224.

Sails, particular descriptions of—cont.**Sprit-sails :**

Gower, 5.
Brims, 71.
Kennedy, 193.

Stay-sails :

Heathcote, 17.
Rowett, 86.
Murray and Wills, 226.

Studding-sails :

Shuldham, 20.
Clark (*Ricketson*), 179.

Top-sails :

Gower, 5.
Penneck and Dunkin, 7.
Tonge, 17.
Higgins, 18.
Shuldham, 20.
Christophers, 50.
Newton, 81.
Rowett, 86.
Gifford, 118.
Dyer, 122.
Webster, 127.
Galloway, 142.
Clark, 163.
Clark (*Ricketson*), 179.

Top-gallant sails :

Gower, 5.
Shuldham, 20.
Rowett, 86.
Galloway, 142.
Clark, 163.
Kennedy, 193.

Try-sails :

Summers, 63.
Cunningham, 141.
Kennedy, 193.

Sails, square, reefing and furling :

Delolme, 3.
Lonsdale, 4.
Cowan, 10.
Bywater, 10.
Tonge, 17.
Shuldham, 20.
Winspear, 43.
Cunningham, 54.
Lamport, 56.
Stocks and Watson, 69.
Dodge, 74.
Cavanah, 77.
Lenox, 79.
Newton, 81.
Rowett, 86.
Cunningham, 83.
Dyer, 93.
Dyer, 96.
Brouard and Hubert, 93.
Cunningham, 93.
Newton, 100.
Benson, 102.
Gilbes (*Boss*), 102.

Sails, square, reefing and furling—cont.

Dyer, 106.
 La Croix, 108.
 Godet, 109.
 Cunningham, 109.
 Cole, 111.
 Gilbee (*Boss*), 112.
 La Baw, 113.
 Crocker, 113.
 Collins, 114.
 Shibbes, 115.
 Gardner, 120.
 Cunningham, 120.
 Fox, 122.
 Dyer, 122.
 Pearce, 128.
 Wain, 130.
 Higgins and Brown, 132.
 Clark (*Wakeman*), 133.
 Clark (*Mulliner*), 144.
 Finlay, 150.
 Cunningham, 151.
 Turpie, 156.
 Scott, 159.
 Moore, 159.
 Campbell and Kendal, 160.
 Sands, 167.
 Collins, 169.
 Goudie, 171.
 Medhurst, 173.
 Butcher, 176.
 Colling, 177.
 Cunningham, 181.
 Mills, 182.
 Laphorn, 184.
 Willett, 186.
 Elliott, 187.
 Mills, 187.
 Baillie, 190.
 Colling and Pinckney, 194.
 Cunningham, 196.
 Clough, 200.
 Foster and Rowden, 201.
 Day and Day, 203.
 Smallwood, 204.
 Phalp, 204.
 Pearson and Smallwood, 207.
 Bowden, 207.
 Fergus, 210.
 Allix, 211.
 Swinburne, 212.
 Shorey and Bell, 212.
 Butchart and Stroud, 213.
 Baines, 214.
 Howard and Wood, 215.
 Congalton, 217.
 Shorey and Gibson, 218.
 Coutanche, 219.
 Bull, 220.
 Davidson, 230.
 Davidson, 232.
 Medhurst, 233.
 Allix, 234.
 Chapman, 238.
 Lungley, 242.

Sails, strengthening with strips of canvas, ropes, &c. :

Gower, 5.
 Trail, 43.
 Brown, 47.
 Godet, 109.
 Gilbee (*Boss*), 112.
 Collins, 114.
 Gifford, 118.
 Sands, 167.

Sails, use of hydraulic power for working :

Knowelden and Edwards, 139.

Sails with ribs :

Dawson (*App.*), 243.

Sails, windmill (used on ship-board). See Windmills.

Serving rope :

Newall, 189.

Shear-legs used as masts. See Masts.

Sheet, letting go :

Beadon, 34.
 Greer, 43.
 Saxby, 70.
 Parley, 135.

Shrouds, wooden :

Eccles, 14.
 Christophers, 50.

Sister-hooks :

Murton, 87.

Spars. See Masts, yards, bowsprits, booms.

Sprits, with jaws round mast :

Eccles, 14.

Stays and shrouds :

Penneck and Dunkin, 7.
 Slater, 8.
 Brown, 11.
 Eccles, 14.
 Bill, 15.
 Guppy, 19.
 Shuldham, 20.
 De la Garde, 29.
 Smith, 33.
 Christophers, 50.
 Dyer, 106.
 Vandercruyce, 161.
 Clark (*Bickelton*), 179.

Stays, iron :

Harratt, 64.

Stay-sails. *See* Sails.

Studding-sails. *See* Sails.

Thimbles :

Van Wart (*Jennings*), 12.
Fontainemoreau, 83.
Morton, 87.
Sharp, 111.
Bennett, 167.

Timber for masts. *See*
Masts.

Top-gallant Sails. *See* Sails.

Top-masts. *See* Masts.

Top-sails. *See* Sails.

Try-sails. *See* Sails.

Varnishes. *See* Compositions.

Wind-mills used to propel
vessels :

Silvester (*App.*), 243.
Brayshaw and McMahon, 6.
Dawson (*App.*), 243.
Maberley, 36.
Carvalho, 37.
Woodley, 39.
Stollmeyer, 41.
Watson, 55.
Brooman, 57.
Perkes, 61.
Bauer, 79.
Hann, 82.
Soelman, 83.
March, 97.
Calvert, 116.
Sloper, 117.
Cave, 124.
Brabazon, 183.
Parker, 143.
Leigh, 170.
Johnson (*Le Rouge and De
Berly*), 178.
Cook and Terrey, 183.
Wheatley, 197.
Barland and O'Keefe (*Bar-
land*), 189.
Barland (*Barland*), 208.

Wire rigging. *See* Rigging.

Yards, iron :

Trevithick and Dickinson,
12.
Bill, 15.
Bill, 15.
Finch, 99.
Hodgson, 105.
Cato and Betteley, 107.
Hebson, 128.
Simons, 165.
Simons, 168.
Harraff, 178.
Russ, 184.
Todd, 209.
Panton and Panton, 217.
Glover, 222.

Yards, iron and timber com-
bined :

Christophers, 50.
McGavin, 64.
Clare, 73.
Chubb, 82.
Robb and Hill, 84.
Gladstone, 91.
Finch, 99.
Brown, 104.
Cato and Betteley, 107.
Hebson, 128.
Brown, 178.
Clark (*Bicketson*), 179.
Moore, 206.

Yards, jointed :

Cunningham, 164.
Lungley, 242.

Yards, slinging :

Delolme, 3.
Higgins, 18.
Dodge, 74.
Cavanah, 77.
Webster, 127.
Moore, 172.
Clark (*Bicketson*), 179.
Tate, 192.

Yards, wooden, making :

Smart, 6.
Atlee, 27.
Roberts, 35.
Day, 39.
Christophers, 50.
Rylands, 64.
Rylands (*Rylands*), 172.
Gifford, 118.

ERRATA.

Page 26, line 16, *for* "lid" *read* "fid."

" 142, " 14, *for* "and boots shoes" *read* "boots and shoes."

" 171, " 2, *for* "stops" *read* "steps," *and for* "the in" *read*
"in the."

" 172, " 16, *for* "amorphose" *read* "amorphous."

" 200, " 22, *for* "stails" *read* "sails."

" 201, lines 23, 24, 25, 26, supply quotation marks at beginning of lines.

LONDON:
Printed by GEORGE E. EYEE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.



PATENT OFFICE.

LIST OF WORKS printed by order of THE COMMISSIONERS OF PATENTS FOR INVENTIONS, and sold at the PATENT OFFICE, 25, Southampton Buildings, Chancery Lane, London.

I.

1. SPECIFICATIONS of PATENTS for INVENTIONS, DISCLAIMERS, &c., enrolled under the Old Law, from A.D. 1617 to Oct. 1852, comprised in 13,561 Blue Books, or 691 thick vols. imp. 8vo. Total cost price about 600*l*.
2. SPECIFICATIONS of INVENTIONS, DISCLAIMERS, &c., deposited and filed under the Patent Law Amendment Act from Oct. 1, 1852, to June 30, 1874, comprised in 72,459 Blue Books, or 2,280 thick vols. imp. 8vo. Total cost price, about 2,325*l*.

II.

INDEXES to PATENTS of INVENTION under the Old Law, from A.D. 1617 to October 1852:—

1. CHRONOLOGICAL INDEX. 2 vols. (1554 pages.) Price 30*s*. ; by post, 33*s*. 2*d*.
2. ALPHABETICAL INDEX. 1 vol. (647 pages.) Price 20*s*. ; by post, 21*s*. 5*d*.
3. SUBJECT-MATTER INDEX. 2 vols. (970 pages.) Second Edition, to which is prefixed a key of Terms and Phrases. 1857. Price 2*l*. 16*s*. ; by post, 2*l*. 18*s*. 8*d*.
4. REFERENCE INDEX of PATENTS of INVENTION, pointing out the Office in which each enrolled Specification may be consulted and the Books in which Specifications, Law Proceedings

connected with Inventions, &c. have been noticed. 1 vol. (710 pages.) Second Edition. 1862. Price 30s.; by post, 31s. 5d.

5. APPENDIX to the REFERENCE INDEX, containing abstracts from such of the early Patents and Signet Bills as describe the nature of the Invention. 1 vol. (91 pages.) Price 4s.; by post, 4s. 6d.

INDEXES of APPLICATIONS for PATENTS and PATENTS GRANTED under the Patent Law Amendment Act, 1852.

CHRONOLOGICAL INDEXES :—

For 1852 (Oct. 1—Dec. 31) and 1853. (258 pages.) Price 11s.; by post 12s.

	s.	d.	s.	d.
1854 (167 pages), price	6	0;	by post	6 9
1855 (188 ")	"	6 6	"	7 2
1856 (189 ")	"	6 6	"	7 2
1857 (196 ")	"	6 6	"	7 2
1858 (188 ")	"	6 0	"	6 8
1859 (196 ")	"	6 6	"	7 1
1860 (209 ")	"	7 0	"	7 7
1861 (215 ")	"	7 0	"	7 7
1862 (237 ")	"	7 6	"	8 2
1863 (220 ")	"	7 0	"	7 7
1864 (222 ")	"	7 0	"	7 7
1865 (230 ")	"	7 0	"	7 7
1866 (239 ")	"	7 0	"	7 8
1867 (254 ")	"	7 6	"	8 2
1868 (274 ")	"	8 0	"	8 8

(For continuation see CHRONOLOGICAL AND DESCRIPTIVE INDEXES.)

ALPHABETICAL INDEXES :—

For 1852 (Oct. 1—Dec. 31) and 1853. (181 pages.) Price 13s.; by post 13s. 8d.

	s.	d.	s.	d.
1854 (119 pages), price	7	0;	by post	7 7
1855 (129 ")	"	7 6	"	8 1
1856 (143 ")	"	8 0	"	8 7
1857 (153 ")	"	8 0	"	8 8
1858 (148 ")	"	8 0	"	8 7
1859 (188 ")	"	10 0	"	10 7
1860 (203 ")	"	10 6	"	11 1
1861 (222 ")	"	10 6	"	11 2
1862 (240 ")	"	11 6	"	12 2
1863 (218 ")	"	11 0	"	11 8
1864 (220 ")	"	11 0	"	11 8
1865 (236 ")	"	11 6	"	12 2
1866 (243 ")	"	11 6	"	12 2
1867 (258 ")	"	12 0	"	12 8
1868 (291 ")	"	13 0	"	13 10
1869 (272 ")	"	13 0	"	13 9
1870 (242 ")	"	12 0	"	12 8

SUBJECT-MATTER INDEXES:—

For 1852 (Oct. 1—Dec. 31). (132 pages.) Price 9s.; by post, 9s. 7d.

	s.	d.	s.	d.
1853 (291 pages), price	16	0	by post	16 11
1854 (311 ")	16	6	"	17 6
1855 (311 ")	17	0	"	17 11
1856 (335 ")	18	6	"	19 7
1857 (367 ")	19	6	"	20 8
1858 (360 ")	19	6	"	20 6
1859 (361 ")	20	0	"	20 11
1860 (405 ")	22	0	"	23 0
1861 (442 ")	23	0	"	24 1
1862 (465 ")	23	0	"	24 1
1863 (432 ")	22	0	"	23 0
1864 (446 ")	23	0	"	24 1
1865 (474 ")	23	0	"	24 1
1866 (465 ")	23	0	"	24 4
1867 (508 ")	25	0	"	26 2
1868 (632 ")	30	0	"	31 5
1869 (587 ")	28	0	"	29 2½
1870 (509 ")	28	0	"	29 2

DESCRIPTIVE INDEXES (Abridgments of Provisional and Complete Specifications).

For 1867. In the following quarterly parts:—

1. Quarter ending 31st March. (228 pages.) Price 1s. 8d.; by post, 2s. 1d.
2. Quarter ending 30th June. (224 pages.) Price 1s. 8d.; by post, 2s. 1d.
3. Quarter ending 30th September. (196 pages.) Price 1s. 8d.; by post, 2s.
4. Quarter ending 31st December. (232 pages.) Price 1s. 8d.; by post, 2s. 1d.

For 1868. In the following quarterly parts:—

1. Quarter ending 31st March. (236 pages.) Price 1s. 8d.; by post, 2s. 1d.
2. Quarter ending 30th June. (218 pages.) Price 1s. 8d.; by post, 2s. 1d.
3. Quarter ending 30th September. (194 pages.) Price 1s. 8d.; by post, 2s.
4. Quarter ending 31st December. (224 pages.) Price 1s. 8d.; by post, 2s. 1d.

CHRONOLOGICAL AND DESCRIPTIVE INDEXES (containing the Abridgments of Provisional and Complete Specifications, with an Alphabetical Index of Names).

For 1869. In the following quarterly parts:

1. Quarter ending 31st March. (226 pages.) Price 1s. 8d.; by post, 2s. 1d.
2. Quarter ending 30th June. (234 pages.) Price 1s. 8d.; by post, 2s. 1d.
3. Quarter ending 30th September. (200 pages.) Price 1s. 8d.; by post, 2s. 1d.
4. Quarter ending 31st December. (212 pages.) Price 1s. 8d.; by post, 2s. 1d.

For 1870. In the following quarterly parts:—

1. Quarter ending 31st March. (222 pages.) Price 1s. 8d.; by post, 2s. 1d.
2. Quarter ending 30th June. (218 pages.) Price 1s. 8d.; by post, 2s. 1d.
3. Quarter ending 30th September. (168 pages.) Price 1s. 8d.; by post, 2s.
4. Quarter ending 31st December. (182 pages.) Price 1s. 8d.; by post, 2s.

CHRONOLOGICAL AND DESCRIPTIVE INDEXES (containing the Abridgments of Provisional and Complete Specifications), with Indexes of Names and Subject Matter.

For 1871. (792 pages, with 77 pages Indexes of Names and Subject Matter = 869 pages). Price 19s.; by post, 20s. 9d.

For 1872. (876 pages, with 92 pages Indexes of Names and Subject Matter = 968 pages). Price 19s.; by post, 20s. 11d.

For 1873. (928 pages, with 136 pages Alphabetical and Subject-matter Indexes = 1,064 pages). Price 19s.; by post, 21s.

For 1874. Published on Friday in each week, and forwarded, post free, to Subscribers. Terms 30s. per annum. Subscriptions received at the Sale Room of the Patent Office, where also single copies may be obtained at 4d. each, except the No. containing the Alphabetical Index for the year and the concluding No. (containing the Subject-matter Index for the year), which will be 2s. each. Post Office Orders to be made payable at the Post Office, Holborn, to Mr. Bennet Woodcroft, Clerk to the Commissioners of Patents.

III.

ABRIDGMENTS (in Classes and Chronologically arranged) of **SPECIFICATIONS** of **PATENTED INVENTIONS**, from the earliest enrolled to those published under the Act of 1852.

These books are of 12mo. size, and each is limited to inventions of one class only. They are so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. Inventors are strongly recommended, before applying for Letters Patent, to consult the classes of Abridgments of Specifications which relate to the subjects of their inventions, and by the aid of these works to select the Specifications they may consider it necessary to examine in order to ascertain if their inventions are new. The following series of Abridgments do not extend beyond the end of the year 1866. From that date the Abridgments will be found in chronological order in the "Chronological and Descriptive Index" (see Section II. of this List of Works). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place the Inventor (by the aid of the Subject Matter Index for each year) can continue his examination of the Abridgments relating to the subject of his invention in the Chronological and Descriptive Index.

The classes already published are,—

1. **DRAINS AND SEWERS; INCLUDING THE MANUFACTURE OF DRAIN TILES AND PIPES**, price 1s., by post 1s. 2d.
2. **SEWING AND EMBROIDERING**, (2nd edition), price 1s. 6d.; by post, 1s. 9d.
3. **MANURE**, price 4d., by post 5d.
4. **PRESERVATION OF FOOD**, Part I., A.D. 1691-1855, price 4d., by post 5d.—
Part II., A.D. 1856-1866, price 6d., by post 7d.

5. MARINE PROPULSION, Parts I, II, & III, A.D. 1618-1857, price 1s. 10d., by post 2s. 1d.—Part IV, A.D. 1857-1866, price 1s. 10d., by post 2s. 2d.
6. MANUFACTURE OF IRON AND STEEL, Parts I, II, & III, A.D. 1621-1857, price 1s. 6d., by post 1s. 8½d.—Part IV, A.D. 1857-1866, price 2s. 6d., by post 2s. 8d.
7. AIDS TO LOCOMOTION, price 6d., by post 7d.
8. STEAM CULTURE, price 8d., by post 9½d.
9. WATCHES, CLOCKS, AND OTHER TIMEKEEPERS, Part I, A.D. 1661-1856, price 8d., by post 9½d.—Part II, A.D. 1857-1866, price 8d., by post 9½d.
10. FIRE-ARMS AND OTHER WEAPONS, AMMUNITION, AND ACCOUTREMENTS, Part I, A.D. 1558-1858, price 1s. 4d., by post 1s. 7½d.—Part II, A.D. 1858-1866, price 2s. 2d., by post 2s. 6d.
11. PAPER, MANUFACTURE OF PAPER PASTEBOARD, AND PAPIER-MÂCHÉ, Part I, A.D. 1665-1857, price 10d., by post 1s.—Part II, A.D. 1858-1866, price 3s. 8d., by post 3s. 10½d.
12. PAPER, CUTTING, FOLDING, AND ORNAMENTING; INCLUDING ENVELOPES, CARDS, PAPER-HANGINGS, &c., price 8d., by post 10d.
13. TYPOGRAPHIC, LITHOGRAPHIC, & PLATE PRINTING, Part I, A.D. 1617-1857, price 2s. 8d., by post 3s. 3d.—Part II, A.D. 1858-1861, price 2s., by post 2s. 6d.
14. BLEACHING, DYEING, AND PRINTING YARNS AND FABRICS, Part I, A.D. 1617-1857, price 3s. 4d., by post 4s. 1d.—Part II, A.D. 1858-1866, price 3s. by post 3s. 4½d.
15. ELECTRICITY AND MAGNETISM, THEIR GENERATION AND APPLICATIONS, Part I, A.D. 1760-1857, price 3s. 2d., by post 3s. 11d.—Part II, A.D. 1858-1866 (2nd edition), price 2s. 8d., by post 3s. 2d.
16. MANUFACTURE AND APPLICATIONS OF INDIA-RUBBER, GUTTA-PERCHA, &c.; INCLUDING AIR, FIRE, AND WATER-PROOFING, price 2s. 8d., by post 3s. 4d.
17. PRODUCTION AND APPLICATIONS OF GAS, Part I, A.D. 1681-1858, price 2s. 4d., by post 2s. 11d.—Part II, A.D. 1859-1866, price 7s., by post 7s. 4½d.
18. METALS AND ALLOYS, price 1s. 10d., by post 2s. 3½d.
19. PHOTOGRAPHY, Part I, A.D. 1839-1859, price 8d., by post 10d.—Part II, A.D. 1860-1866 (2nd edition), price 10d., by post 11½d.
20. WEAVING, Part I, A.D. 1620-1859, price 4s., by post 4s. 11½d.—Part II, A.D. 1860-1866, price 2s. 8d., by post 3s. 1d.
21. SHIP BUILDING, REPAIRING, SHEATHING, LAUNCHING, &c., Part I, A.D. 1618-1860, price 2s. 4d., by post 2s. 11d.—Part II, A.D. 1861-1866, price 2s. 6d., by post 2s. 11d.
22. BRICKS AND TILES, Part I, A.D. 1619-1860, price 1s., by post 1s. 3½d.—Part II, A.D. 1861-1866, price 8d., by post 9½d.
23. PLATING OR COATING METALS WITH METALS, Part I, A.D. 1637-1860, price 10d., by post 1s. 0½d.—Part II, A.D. 1861-1866 (2nd edition), price 6d. by post 7d.
24. POTTERY, Part I, A.D. 1626-1861, price 10d., by post 1s.—Part II, A.D. 1862-1866, price 6d., by post 7d.
25. MEDICINE, SURGERY, AND DENTISTRY (2nd edition), price 1s. 10d., by post 2s. 1½d.
26. MUSIC AND MUSICAL INSTRUMENTS (2nd edition), price 1s. 10d., by post 2s. 1½d.
27. OILS, FATS, LUBRICANTS, CANDLES, AND SOAP (2nd edition), price 2s. 10d., by post 3s. 4d.
28. SPINNING; INCLUDING THE PREPARATION OF FIBROUS MATERIALS, AND THE DOUBLING OF YARNS AND THREADS, Part I, A.D. 1624-1863, price 24s., by post 25s. 5d.—Part II, A.D. 1864-1866, price 2s. by post 2s. 4d.
29. LACE AND OTHER LOOPED AND NETTED FABRICS, price 10s., by post 10s. 8d.
30. PREPARATION AND COMBUSTION OF FUEL, price 17s., by post 17s. 9d.
31. RAISING, LOWERING, AND WEIGHING (2nd edition) price 3s. 8d., by post 4s. 3½d.
32. HYDRAULICS, (2nd edition), price 4s. 8d., by post 5s. 5d.
33. RAILWAYS (2nd edition), price 2s. 6d., by post 2s. 11d.
34. SADDLERY, HARNESS, STABLE FITTINGS, &c., price 1s., by post 1s. 2d.
35. ROADS AND WAYS, price 1s., by post 1s. 2d.
36. BRIDGES, VIADUCTS, AND AQUEDUCTS, price 10d., by post 1s.
37. WRITING INSTRUMENTS AND MATERIALS, price 1s. 4d., by post 1s. 7d.
38. RAILWAY SIGNALS AND COMMUNICATING APPARATUS, price 5s. 10d., by post 6s. 1½d.
39. FURNITURE AND UPHOLSTERY, price 2s., by post 2s. 4d.
40. ACIDS, ALKALIES, OXIDES, AND SALTS, price 3s. 8d., by post 4s. 3d.
41. AERONAUTICS, price 4d., by post 5d.
42. PREPARATION AND USE OF TOBACCO, price 10d., by post 1s.
43. BOOKS, PORTFOLIOS, CARD-CASES, &c., price 10d., by post 1s.

44. LAMPS, CANDLESTICKS, CHANDELIERS, AND OTHER ILLUMINATING APPARATUS, price 2s. 6d., by post 2s. 10½d.
45. NEEDLES AND PINS, price 6d., by post 7d.
46. CARRIAGES & OTHER VEHICLES FOR RAILWAYS, price 5s. 6d., by post, 6s. 4d.
47. UMBRELLAS, PARASOLS, AND WALKING STICKS, price 10d., by post 11½d.
48. SUGAR, price 1s. 10d., by post 2s. 1½d.
49. STEAM ENGINE, Part I. (in 2 vols.), A.D. 1618-1858, price 2s. 4d., by post 10s. 10½d.—Part II. (in 2 vols.), A.D. 1860-1906, price 4s. 10d., by post 5s. 7d.
50. PAINTS, COLOURS, AND VARNISHES, price 1s. 10d., by post 2s. 1½d.
51. TOYS, GAMES, AND EXERCISERS, price 1s., by post 1s. 2d.
52. VENTILATION, price 1s. 10d., by post 2s. 0½d.
53. FARRIERY; INCLUDING THE MEDICAL AND SURGICAL TREATMENT OF ANIMALS, price 1s., by post 1s. 1½d.
54. ARTISTS' INSTRUMENTS AND MATERIALS, price 10d., by post 1s.
55. SKINS, HIDES, AND LEATHER, price 1s. 6d., by post 1s. 8½d.
56. PREPARING AND CUTTING CORK; BOTTLING LIQUIDS; SECTRING AND OPENING BOTTLES, &c., price 1s. 6d., by post, 1s. 9d.
57. BRUSHING AND SWEEPING, price 1s., by post, 1s. 2d.
58. NAILS, RIVETS, BOLTS, SCREWS, NUTS, AND WASHERS, price 1s. 8d., by post, 1s. 11½d.
59. HINGES, HINGE JOINTS, AND DOOR SPRINGS, price 8d., by post, 9½d.
60. LOCKS, LATCHES, BOLTS, AND SIMILAR FASTENINGS, price 1s. 6d., by post, 1s. 9d.
61. COOKING, BREAD-MAKING, AND THE PREPARATION OF CONFECTIONERY, price 1s. 10d., by post 2s. 1½d.
62. AIR, GAS, AND OTHER MOTIVE POWER ENGINES, price 1s. 10d., by post 2s. 1½d.
63. WATER CLOSETS, EARTH CLOSETS, URINALS, &c., price 10d., by post, 1s.
64. SAFES, STRONG ROOMS, TILLS, AND SIMILAR DEPOSITORIES, price 6d., by post, 7d.
65. WEARING APPAREL. DIVISION I.—HEAD COVERINGS, price 1s. 4d., by post, 1s. 6½d.
66. WEARING APPAREL. DIVISION II.—BODY COVERINGS (in course of preparation).
67. WEARING APPAREL. DIVISION III.—FOOT COVERINGS (in course of preparation).
68. WEARING APPAREL. DIVISION IV.—DRESS FASTENINGS (in course of preparation).
69. ANCHORS, price 6d., by post 7d.
70. METALLIC PIPES AND TUBES, price 1s. 8d., by post, 1s. 11d.
71. MINING, QUARRYING, TUNNELLING, AND WELL-SINKING, price 1s. 4d., by post 1s. 6½d.
72. MILKING, CHURNING, AND CHEESE-MAKING, price 6d., by post 7d.
73. MASTS, SAILS, RIGGING, &c.; INCLUDING APPARATUS FOR RAISING AND LOWERING SHIPS' BOATS, price 1s., by post 1s. 2d.

IV.

COMMISSIONERS of PATENTS' JOURNAL, published on the evenings of Tuesday and Friday in each week. Price 2d.; by Post, 3d. Annual Subscription, including postage, 23s. 6d., which may be remitted by Post Office Order, made payable at the Post Office, Holborn, to Mr. Bennet Woodcroft, Clerk to the Commissioners, Patent Office.

CONTENTS OF JOURNAL.

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Applications for Letters Patent. 2. Grants of Provisional Protection for six months. 3. Inventions protected for six months by the deposit of a Complete Specification. 4. Notices to proceed. 5. Patents sealed. 6. Patents extended. 7. Patents cancelled. 8. Patents on which the third year's stamp duty of 50<i>l.</i> has been paid. 9. Patents which have become void by non-payment of the stamp duty of 50<i>l.</i> before the expiration of the third year. | <ol style="list-style-type: none"> 10. Patents on which the seventh year's stamp duty of 100<i>l.</i> has been paid. 11. Patents which have become void by non-payment of the stamp duty of 100<i>l.</i> before the expiration of the seventh year. 12. Colonial Patents and Patent Law. 13. Foreign Patents and Patent Law. 14. Weekly price lists of printed Specifications, &c. 15. Official advertisements and notices of interest to Patentees and Inventors generally. |
|--|--|

V.

1. **PATENT LAW AMENDMENT ACTS** (15 & 16 Vict. cap. 83, A.D. 1852; 16 Vict. cap. 5, A.D. 1853; and 16 & 17 Vict. cap. 115, A.D. 1853); together with the **RULES and REGULATIONS** issued by the Commissioners of Patents for Inventions, and by the Lord Chancellor and the Master of the Rolls, under the Acts 15 & 16 Vict. c. 83, and 16 & 17 Vict. c. 115. Price 6*d.*; by post, 7*d.*
2. **APPENDIX to the SPECIFICATIONS of ENGLISH PATENTS for REAPING MACHINES.** By B. WOODCROFT, F.R.S. Price 6*s.* 6*d.*; by post, 6*s.* 11*d.*
3. **INDEX to ALL INVENTIONS PATENTED in ENGLAND** from 1617 to 1854 inclusive, arranged under the greatest number of heads, with parallel references to **INVENTIONS and DISCOVERIES** described in the scientific works of **VARIOUS NATIONS**, as classified by Professor Schubarth. By B. WOODCROFT, F.R.S. Price 1*s.*; by post, 1*s.* 1*d.*
The foreign works thus indexed form a portion of the Library of the Commissioners of Patents, where they may be consulted.
4. **EXTENSION of PATENTS to the COLONIES.**—Abstract of Replies to the Secretary of State's Circular Despatch of January 2, 1853, on the subject of the Extension of Patents for Inventions to the Colonies. Second Edition, with Revised Table. 1861. Price 2*s.*; by post, 2*s.* 1½*d.*
5. **PATENT RIGHTS in the COLONIES.**—Abstract of Replies to the Secretary of State's Circular Despatch of July 11, 1856, calling for Information as to the form of the application to be made by persons desirous of obtaining Patent Rights in the Colonies, and the expenses attendant on the Grant of such Patent Rights. Price 2*s.*; by post, 2*s.* 1½*d.*
6. **COPY of AMERICAN PATENT, SPECIFICATION, and other DOCUMENTS** relating to an invention of "A new and useful improved method of removing incrustation from boilers," presented by Davis Embree, of Dayton, Ohio, United States of America, to The Government and People of the United Kingdom of Great Britain and Ireland, 21st April 1865. Price 6*d.*; by post, 6½*d.*
7. **SUPPLEMENT to the SERIES of LETTERS PATENT and SPECIFICATIONS, from A.D. 1617 to Oct. 1852;** consisting for the most part of Reprints of scarce Pamphlets, descriptive of the early patented Inventions comprised in that Series.

CONTENTS.

1. **Metallica; or the Treatise of Metallica, briefly comprehending the doctrine of diverse new metallical inventions, &c.** By SIMON STURTEVANT. (*Letters Patent, dated 29th February 1611.*) Price 1*s.* 4*d.*; by post, 1*s.* 5*d.*

the authorities of the most important towns in the kingdom, on condition that the works shall be rendered daily accessible to the public, for reference or for copying, free of all charge. The following list gives the names of the towns, and shows the place of deposit, so far as ascertained, of each set of the works thus presented :—

- Aberdeen (*Mechanics' Institution*).
 Belfast (*Queen's College*).
 Beverley (*Guildhall*).
 Birmingham (*Central Free Library—Reference Department, Ratchliff Place*).
 Blackburn (*Free Library and Museum, Town Hall Street*).
 Bolton-le-Moors (*Public Library, Exchange Buildings*).
 Bradford, Yorkshire (*Borough Accountant's Office, Corporation Buildings, Swain Street*).
 Brighton (*Town Hall*).
 Bristol (*City Library, King Street*).
 Burnley (*Office of the Burnley Improvement Commissioners*).
 Bury.
 Carlisle (*Public Free Library, Police Office*).
 Cork (*Royal Cork Inst., Nelson Place*).
 Crewe (*Railway Station*).
 Darlington (*Mechanics' Institute, Skimmergate*).
 Derby (*Free Public Library*).
 Dorchester.
 Drogheda.
 Dublin (*Royal Dublin Soc., Kildare St.*).
 Dundalk (*Free Library*).
 Falmouth (*Public Lib., Church St.*).
 Gateshead (*Mechanics' Institute*).
 Gorton (*Railway Station*).
 Glasgow (*Stirling's Lib., Miller St.*).
 Grimsby, Great (*Mechanics' Institution, Victoria Street*).
 Halifax.
 Hertford (*Free Public Library, Town Hall*).
 Huddersfield (*Improvement Commissioners' Offices, South Parade*).
 Hull (*Mechanics' Inst., George St.*).
 Ipswich (*Museum Library, Museum Street*).
 Keighley (*Mechanics' Inst., North St.*).
 Kidderminster (*Public Free Library, Public Buildings, Vicar Street*).
 Lancaster (*Mechanics' Institute, Market Street*).
 Leamington Priors (*Public Library, Town Hall*).
 Leeds (*Public Library, Infirmary Buildings*).
 Leicester (*Free Library, Wellington Street*).
 Limerick (*Town Hall*).
 Liverpool (*Free Public Library, William Brown Street*).
 London (*British Museum*).
 ——— (*Society of Arts, John Street, Adelphi*).
 Macclesfield (*Useful Knowledge Society*).
 Maidstone (*Free Library*).
 Manchester (*Free Lib., Camp Field*).
 Montrose (*Free Library*).
 Newcastle-upon-Tyne (*Literary and Philosophical Society*).
 Newport, Monmouth (*Commercial Room, Town Hall*).
 Northampton.
 Norwich (*Free Library, St. John's Maddermarket*).
 Nottingham (*Free Library*).
 Oldham (*School of Arts and Sciences, Lyceum*).
 Oxford (*Public Free Library, Town Hall*).
 Paisley (*Government School of Design, Gilmour Street*).
 Plymouth (*Mechanics' Institute, Princess Square*).
 Preston, Lancashire (*Dr. Shepherd's Library, the Institution, Avenham*).
 Reading (*Literary, Scientific, and Mechanics' Institution, London St.*).
 Rochdale (*Free Public Library, Town Hall*).
 Rotherham (*Board of Health Offices Howard Street*).
 Salford (*Royal Museum and Library, Peel Park*).
 Sheffield (*Free Public Library, Surrey Street*).
 Southampton (*Hartley Institution*).
 Stirling (*Burgh Library, Town House, Broad Street*).
 Stockport (*Museum, Vernon Park*).
 Sunderland (*Corporation Museum, Athenæum, Fawcett Street*).
 Wakefield (*Mechanics' Institution, Barstow Square*).
 Warrington (*The Museum and Library*).
 Waterford (*Town Hall, The Mall*).
 Wexford (*Mechanics' Institute, Crescent Quay*).
 Wigan.
 Wolverhampton (*Free Library*).
 Wolverton (*Railway Station*).
 York (*Lower Council Chamber, Guildhall*).

The Commissioners' publications have also been presented to the following Public Offices, Seats of Learning, Societies, British Colonies, and Foreign States :—

Public Offices, &c.

Admiralty—Chatham Dockyard.	War Office, Pall Mall.
Sheerness ditto.	India Office.
Portsmouth ditto.	Royal School of Mines, &c., Jermyn Street, Piccadilly.
Devonport ditto.	Dublin Castle, Dublin.
Pembroke ditto.	Record and Writ Office, Chancery, Dublin.
Artillery Institution, Woolwich.	Office of Chancery, Edinburgh.
Board of Trade, Whitehall.	
Ordnance Office—Pall Mall.	
Small Arms Factory, Enfield.	

Seats of Learning and Societies.

Cambridge University.	Queen's College, Galway.
Trinity College, Dublin.	Incorporated Law Society, Chancery Lane, London.

British Colonies.

Barbados.	India—Bengal.	Prince Edward Island.
British Guiana.	Bombay.	South Australia—Colonial Institute, Adelaide.
Canada—Library of Parliament, Ottawa.	Madras.	Tasmania.
Bureau of Agriculture, Toronto.	N.-W. Provinces.	Trinidad.
Board of Arts and Manufactures, Montreal.	Jamaica.	Victoria—Parliamentary Library, Melbourne.
Cape of Good Hope.	Malta.	Patent Office, Melbourne.
Ceylon.	Mauritius.	Public Library, Melbourne.
	New Brunswick.	
	Newfoundland.	
	New South Wales.	
	New Zealand.	
	Nova Scotia.	

Foreign States.

Argentina Republic—Buenos Ayres.
Austria—Athenæum, Vienna.
Belgium—Ministère de l'Intérieur, Brussels.
Musée de l'Industrie, Brussels.
France—Bibliothèque Nationale, Paris.
Conservatoire des Arts et Métiers, Paris.
Germany—Alsace—Société Industrielle, Mulhouse.
Bavaria—Königliche Bibliothek, Munich.
Gotha—Ducal Friedenstein Collection.
Prussia—Königliche Polytechnische Schule, Aix-la-Chapelle.
Gewerbe-Akademie, Berlin.
Königliche Bibliothek, Berlin.
Königliche Polytechnische Schule, Hanover.
Saxony—Polytechnische Schule, Dresden.
Württemberg—Bibliothek des Musterlagers Stuttgart.
Italy—Uffizio delle Privative, Rome.
Netherlands—Harlem.
Russia—Bibliothèque Impériale, St. Petersburg.
Spain—Madrid.
Sweden—Teknologiska Institutet, Stockholm.
United States—Patent Office, Washington.
Astor Library, New York.
State Library, Albany.
Franklin Institute, Philadelphia.
Free Public Library, Boston.
Library Company, Philadelphia.
Free Public Library, Chicago.
Peabody Institute, Baltimore.
Historical Society, Madison, Wisconsin.
Cornell University, Ithaca, N.Y.
Mercantile Library, St. Louis.
Mechanics' Institute, San Francisco.

Grants of complete series of Abridgments of Specifications have been made to the undermentioned Mechanics' Literary and Scientific Institutions:—

- Abertystwith** (*Literary and Working Men's Reading Room*).
Alnwick (*Scientific and Mechanical Institution*).
Alton (*Mechanics' Institution*).
Altrincham (*Altrincham and Bowdon Literary Institution*).
Ashby-de-la-Zouch (*Mutual Improvement Society*).
Ashton-under-Lyne (*Mechanics' Institution*).
Bacup (*Mechanics' Institution*).
Ballymoney (*Town Hall*).
Banbridge (*Literary and Mutual Improvement Society*).
Banbury (*Mechanics' Institution*).
Barnstaple (*Literary and Scientific Institution*).
Bath (*Athenæum*).
 — (*Royal Literary and Scientific Institution*).
Batley (*Mechanics' Institution*).
Battle (*Young Men's Christian Association*).
Belfast (*Athenæum*).
 — (*People's Literary Institute*).
Berkhamstead, Great (*Mechanics' Institute*).
 — (*Working Men's College*).
Birkenhead (*Literary and Scientific Society*).
Birmingham (*Bloomsbury Institution*).
 — (*Central Lending Library*).
 — (*Deritend Working Men's Association*).
 — (*Free Library and News Room, Gosta Green*).
 — (*Graham Street Institution*).
 — (*Gun Makers' and Inventors' Club*).
 — (*Law Students' Society*).
Bodmin (*Literary Institution*).
Bolton (*Mechanics' Institute*).
 — (*School of Art*).
Bournemouth (*Library and Reading Room*).
Bradford, Yorkshire (*Church Institute*).
 — (*Library and Literary Society*).
 — (*Mechanics Institute*).
Braintree (*Braintree and Bocking Literary and Mechanics' Institution*).
Brampton, near Chesterfield (*Local Museum and Literary Institute*).
Breage, Cornwall (*Institution*).
Bristol (*Athenæum*).
 — (*Institution*).
 — (*Law Library Society*).
 — (*Library*).
Bromsgrove (*Literary and Mechanics' Institute*).
Burnley (*Literary Institution*).
 — (*Mechanics' Institution*).
Burslem (*Wedgwood Institute*).
Bury (*Athenæum*).
Bury St. Edmund's (*Athenæum*).
 — (*Mechanics' Institution*).
Calne (*Literary Institution*).
Canterbury (*Working Men's Club*).
Cardigan (*Mechanics' Institute*).
Carharrack (*Literary Institute*).
Carmarthen (*Literary and Scientific Institution*).
Cheddar (*Literary Institution*).
Cheltenham (*Literary and Philosophical Society*).
 — (*Permanent Library*).
 — (*Working Men's Club*).
Chertsey (*Literary and Scientific Institution*).
Chester (*City Library and Reading Room*).
Chesterfield (*Mechanics' Institution*).
Chichester (*Literary and Philosophical Society*).
 — (*Literary Society and Mechanics' Institute*).
Chippenham (*Literary and Scientific Institution*).
Christchurch (*Working Man's Institute*).
Clevedon (*Village Hall Institution for Working Men*).
Cockermouth (*Mechanics' Institution*).
Coggeshall (*Literary and Mechanics' Institution*).
Colchester (*Literary Institution*).
 — (*Young Men's Christian Association*).
Compstall (*Athenæum*).
Coventry (*Free Library*).
 — (*Institute*).
 — (*School of Art*).
Crediton (*Working Men's Club*).
Orewe (*Mechanics' Institution*).
Dartmouth (*Mutual Improvement Society*).
Deal (*Deal and Walmer Institute*).
Denton (*Denton and Haughton Mechanics' Institution*).
Derby (*Mechanics' Institution*).
Devonport (*Mechanics' Institute*).
Dewsbury (*Mechanics' Institution*).
Diss (*Reading Room and Library*).
Doncaster (*Free Library*).
 — (*Great Northern Mechanics' Institute*).
Dorchester (*County Museum and Library*).
 — (*Working Men's Institute*).
Dudley (*Mechanics' Institution*).
Dukinfield (*Village Library and Reading Room*).
Dumbarton (*Philosophical and Literary Society*).
Dumfries (*Mechanics' Institution*).

Dundee (*Young Men's Christian Association and Literary Institution*).
 Durham (*Mechanics' Institute*).
 Eagley, Bolton-le-Moors (*Library and Institute*).
 Ealing (*Mechanics' Institute*).
 Earlestown, Newton-le-Willows (*Mutual Improvement Society*).
 Ebbw Vale (*Literary and Scientific Institute*).
 Edinburgh (*Philosophical Institution*).
 — (*Royal Scottish Society of Arts*).
 — (*Subscription Library*).
 — (*Watt Institution and School of Art*).
 — (*Working Men's Club*).
 Egham (*Literary Institute*).
 Egremont (*Mechanics' Institute*).
 — (*Workmen's Institute*).
 Exeter (*Devon and Exeter Albert Memorial Museum, School of Science and Art, and Free Library*).
 — (*Devon and Exeter Institution*).
 Farnham (*Young Men's Association*).
 Faversham (*Institute*).
 Frome (*Literary and Scientific Institution*).
 — (*Mechanics' Institution*).
 Gainsborough (*Literary, Scientific and Mechanics' Institute*).
 Garforth, near Leeds (*Working Men's Club*).
 Glasgow (*Athenæum*).
 — (*Central Working Men's Club and Institute*).
 — (*Institution of Engineers in Scotland*).
 — (*Mechanics' Institution, Bath Street*).
 — (*Philosophical Society*).
 Glastonbury (*Literary Institute*).
 Godmanchester (*Working Men's Reading Room*).
 Gosport (*Gosport and Alverstoke Literary and Scientific Institution*).
 Grantham (*Public Literary Institution*).
 Gravesend (*Gravesend and Milton Library and Reading Rooms*).
 Greenwich (*Working Men's Institute*).
 Guernsey (*Mechanics' Institution and Literary Society*).
 — (*Working Men's Association*).
 Guildford (*Mechanics' Institute*).
 — (*Working Men's Institution*).
 Hadleigh (*Young Men's Institute*).
 Halesworth (*Mechanics' Institute*).
 Halifax (*Literary and Philosophical Society*).
 — (*Mechanics' Institute*).
 — (*Working Men's College*).
 Halstead (*Literary and Mechanics' Institute*).
 Haillingdon (*Institute*).
 Hastings (*Literary and Scientific Institution*).
 — (*Mechanics' Institution*).
 Hawarden (*Literary Institution*).

Hebden Bridge, near Todmorden (*Mechanics' Institution*).
 Helston (*Reading Room and Library*).
 Hemel Hempsted (*Mechanics' Institute*).
 Hereford (*Natural History, Philosophical, Antiquarian, and Literary Society*).
 Hertford (*Literary and Scientific Institution*).
 Heywood (*Mechanics' Institute*).
 Hitchin (*Mechanics' Institute*).
 Holbeck (*Mechanics' Institution*).
 Hollingwood (*Working Men's Club*).
 Holt, Norfolk (*Literary Society*).
 Holywell Green (*Mechanics' Institution*).
 Horncastle (*Mechanics' Institution*).
 Huddersfield (*Mechanics' Institution*).
 Hull (*Church Institute*).
 — (*Literary, Scientific, and Mechanics' Institute*).
 — (*Lyceum Library*).
 — (*Royal Institution, Albion Street*).
 — (*Young People's Institute*).
 Huntingdon (*Literary and Scientific Institution*).
 Inverness (*Working Men's Club*).
 Ipswich (*Working Men's College*).
 Kendal (*Christian and Literary Institution*).
 — (*Mechanics' Institute*).
 — (*Working Men's Institute*).
 Kidderminster (*Mechanics' Institute*).
 Lancaster (*Mechanics' Institute and School of Science*).
 Lee, Kent (*Working Men's Institution*).
 Leeds (*Chapeltown Branch Library*).
 — (*Church Institute*).
 — (*Holbeck Branch Library*).
 — (*Hunslet Branch Library*).
 — (*Leeds Library*).
 — (*Mechanics' Institution and Literary Society*).
 — (*Philosophical and Literary Society*).
 — (*Working Men's Institute*).
 — (*Young Men's Christian Association*).
 Leek, Staffordshire (*Literary and Mechanics' Institution*).
 Leicester (*Law Society*).
 — (*Young Men's Christian Association*).
 Leighton Buzzard (*Working Men's Mutual Improvement Society*).
 Leith (*Mechanics' Subscription Library*).
 Lewes (*Fitzroy Memorial Library*).
 — (*Mechanics' Institute*).
 — (*School of Science and Art*).
 Lincoln (*Mechanics' Institute*).
 Liverpool (*Institute*).
 — (*Mechanics' Institute*).
 — (*Medical Institution*).
 — (*Polytechnic Society*).
 Llanelly (*Chamber of Commerce and Reading Room*).
 Lockwood (*Mechanics' Institution*).

London (*Albert Working Men's Club, Knightsbridge*).
 — (*Bank of England Library and Literary Association*).
 — (*Beaumont Institute, Mile End*).
 — (*Bedford Working Men's Institute, Spitalfields*).
 — (*Birkbeck Institution, Southampton Buildings, Chancery Lane*).
 — (*Bow and Bromley Road Institute, Bow Road*).
 — (*Bow Common Working Men's Club, Devon's Road, Bow Common*).
 — (*Christchurch Working Men's Club, New Street Lark Hall Lane, Clapham*).
 — (*Clerkenwell Club, Lower Rosoman Street*).
 — (*Guildhall Library*).
 — (*Holloway Working Men's Club and Institute, Holloway Road*).
 — (*Literary and Scientific Institution, Walworth*).
 — (*London Association of Foremen Engineers and Draughtsmen*).
 — (*St. James and Soho Working Men's Club, Rupert Street, Soho*).
 — (*St. Mary Charterhouse Working Men's Club, Golden Lane*).
 — (*South London Working Men's College, Blackfriars Road*).
 — (*Southpark Working Men's Club, Broadwall, Stamford Street*).
 — (*Working Men's Club, Brixton Hill*).
 — (*Working Men's Club, St. Mark's, Victoria Docks*).
 — (*Working Men's Club and Institute, Battersea*).
 — (*Working Men's Club and Institute Union, Strand*).
 — (*Working Men's Club, Triangle, Hackney*).
 — (*Working Men's College, Great Ormond Street*).
 Lowestoft (*Library and Reading Room*).
 Lye (*Institution*).
 Lynton (*Literary Institute*).
 Madeley, Shropshire (*Anstice Memorial, Workmen's Club and Institute*).
 Maidstone (*St. Paul's Literary Institute*).
 — (*Working Men's Club and Institute*).
 Maldon, Essex (*Literary and Mechanics' Institute*).
 Manchester (*Ancoats Branch Free Library*).
 — (*Athenæum*).
 — (*Campfield Free Lending Library*).
 — (*Cheetham Branch Library*).
 — (*Chorlton and Ardwick Branch Free Library*).
 — (*Hulme Branch Free Library*).
 — (*Law Library*).
 — (*Mechanics' Institution*).

Manchester (*Natural History Museum, Peter Street*).
 — (*Owen's College*).
 — (*Portico Library, Mosley Street*).
 — (*Rochdale Road Branch Free Library*).
 — (*Royal Exchange Library*).
 — (*Scientific and Mechanical Society*).
 Mansfield (*Co-operative Industrial Society*).
 — (*Mechanics', Artizans', and Apprentices' Library*).
 — (*Mechanics' Institute*).
 Marlborough (*Reading and Mutual Improvement Society*).
 — (*Working Men's Hall*).
 Melksham (*Mutual Improvement Society*).
 Melton Mowbray (*Literary Institute*).
 Mere, near Bath (*Literary Association*).
 Merthyr-Tydfil (*South Wales Institute of Engineers*).
 Middlesbrough (*Iron and Steel Institute*).
 — (*Mechanics' Institution*).
 Middlewich (*Literary and Scientific Institution*).
 Modbury (*Mechanics' Institution*).
 Mossley (*Mechanics' Institute*).
 Needham Market (*Literary Association*).
 Newark (*Mechanics' Institute*).
 Newbury (*Literary and Scientific Institution*).
 Newcastle-upon-Tyne (*Mechanics' Institution*).
 — (*Working Men's Club*).
 New Mills, near Stockport (*Mechanics' Institute*).
 Newport, Isle of Wight (*Young Men's Society and Reading Room*).
 Northampton (*Mechanics' Institute*).
 Nottingham (*Free Library*).
 — (*Mechanics' Institution*).
 — (*Subscription Library, Bromley House*).
 Odiham (*Mechanics' Institution*).
 Oldham (*Analytic Literary Institution*).
 — (*Mechanics' Institution, Werneth*).
 Ormskirk (*Public Library*).
 Oswestry (*Institute*).
 Over, Cheshire (*Working Men's Institute*).
 Oxford (*North Oxford Working Men's Club*).
 Patricroft (*Mechanics' Institution*).
 Pembroke Dock (*Mechanics' Institute*).
 Pendleton (*Mechanics' Institution*).
 Penryn (*Working Men's Club and Reading Room*).
 Perth (*Mechanics' Library, High Street*).

- Peterborough (*Mechanics' Institution*).
Plymouth (*Working Men's Institute*).
Pontypool (*Literary Institute*).
Poole (*Literary and Scientific Institution*).
— (*Mechanics' Institute*).
Port Glasgow (*Public Library*).
Portsea Island (*Young Men's Christian Association*).
Preston (*Institution for the Diffusion of Knowledge*).
Reigate (*Mechanics' Institution*).
Retford (*Literary and Mutual Improvement Society*).
Richmond (*Working Men's College*).
Rotherham (*Rotherham and Masbro' Literary and Mechanics' Institute*).
Royston (*Institute*).
Ryde, Isle of Wight (*Philosophical and Scientific Society*).
— (*Young Men's Christian Association and Literary Institute*).
Saffron Walden (*Literary and Scientific Institution*).
St. Just (*Institution*).
St. Leonard's (*Mechanics' Institution*).
Salford (*Working Men's Club*).
Salisbury (*Literary and Scientific Institution*).
Saltire (*Literary Institute*).
Selby (*Mechanics' Institute*).
Sevenoaks (*Literary and Scientific Institution*).
Shaftesbury (*Literary Institution*).
Sheerness (*Literary Institute*).
Sheffield (*Branch Free Library*).
— (*Brightside Branch Library*).
— (*Literary and Philosophical Society, School of Arts*).
— (*Mechanics' Institution*).
Shepton Mallet (*Reading and Mutual Improvement Society*).
Sidmouth (*Mechanics' Hall*).
Skipton, Yorkshire (*Mechanics' Institute*).
Slough (*Mechanics' Institute*).
Smethwick, Staffordshire (*Library, Reading Room, and Literary Institution*).
Southampton (*Polytechnic Institution*).
— (*Workmen's Hall*).
Southport (*Athenæum*).
South Shields (*Public Free Library*).
— (*Working Men's Institute and Club*).
Southwell (*Literary Institution*).
Spalding (*Mechanics' Institute*).
— (*Christian Young Men's Association*).
Stafford (*Mechanics' Institution*).
Staines (*Literary and Scientific Institution*).
— (*Mechanics' Institute and Reading Room*).
Stalybridge, Cheshire (*Mechanics' Institution*).
Stamford (*Institution*).
Stourbridge (*Associated Institute*).
Stourbridge (*Church of England Association*).
— (*Iron Works Reading Room and Library*).
— (*Mechanics' Institution*).
— (*Working Men's Institute*).
Stowmarket (*Literary Institution*).
Stratford (*Working Men's Hall*).
Sudbury, Suffolk (*Literary and Mechanics' Institute*).
Sunderland (*Working Men's Club*).
Swansea (*Royal Institution of South Wales*).
— (*Working Man's Institute*).
Tavistock (*Mechanics' Institute*).
— (*Public Library*).
Thornton, near Bradford (*Mechanics' Institute*).
Thornton Heath, Croydon (*Workmen's Club*).
Tudmorden (*Mechanics' Institution*).
Truro (*Cornwall County Library*).
— (*Institution*).
— (*Royal Institution of Cornwall*).
Tunbridge (*Literary and Scientific Institution*).
— (*Mechanics' Institute*).
Tunbridge Wells (*Mechanics' Institution*).
— (*Society of Literature and Science*).
Turton, near Bolton (*Chapel Town Institute*).
Tynemouth (*Free Public Library*).
Ulverston (*Temperance Hall*).
Uttoxeter (*Mechanics' Literary Institute*).
Uxbridge (*Uxbridge and Hillingdon Reading and Newsroom Institute*).
Wakefield (*Mechanics' Institute*).
Wallingford (*Free Library and Literary Institution*).
Walsall (*Free Library*).
Walsham-le-Willows, Suffolk (*Institute*).
Ware (*Institute*).
Warminster (*Athenæum*).
Watford (*Literary Institution*).
Wells, Somerset (*Mechanics' Institution, Grove Lane*).
— (*Young Men's Society*).
Whaleybridge (*Mechanics' Institute*).
Whitby (*Institute*).
— (*Museum*).
— (*Subscription Library*).
Whitehaven (*Mechanics' Institution*).
— (*Working Men's Reading Room*).
Whitstable (*Institute*).
Wilton (*Literary Institution*).
Winchester (*Mechanics' Institution*).
— (*Training College*).
Wirksworth (*Mechanics' Institution*).
Wisbech (*Mechanics' Institute*).
Witham (*Literary Institution*).
Witney (*Athenæum*).
Wolverhampton (*Low Library*).
— (*Library*).
Wolverton (*Institute*).

Woodbridge (*Literary and Mechanics' Institute*).
 — (*Working Men's Hall*).
 Worcester (*Railway Literary Institute*).
 — (*Workman's Hall*).
 Farnmouth, Great (*Parochial Library and Museum*).

Yeovil (*Mutual Improvement Society*).
 York (*Church Institute*).
 — (*Institute of Popular Science, &c.*).
 — (*North Eastern Railway Library and Reading Room*).

Presentations of portions of the Works, published by order of the Commissioners of Patents, have been made to the following Libraries:—

Armagh (*Town Clerk's Office*).
 Aylesbury (*Mechanics' Institution and Literary Society, Kingsbury*).
 Birmingham (*Institution of Mechanical Engineers, Newhall Street*).
 Boston, Lincolnshire (*Public Offices, Market Place*).
 Cambridge (*Free Library, Jesus Lane*).
 Cardiff (*Free Library and Museum*).
 Chester (*Mechanics' Institute, St. John Street*).
 Coalbrookdale (*Literary and Scientific Institution*).
 Coventry (*Watchmakers' Association*).
 Darwen, Over (*Free Public Library*).
 Dublin (*Dublin Library, D'Olier Street*).
 Edinburgh (*Horological Society*).
 Ennis (*Public Library*).
 Gloucester (*Working Men's Institute, Southgate Street*).
 Guernsey (*Public Record Office*).
 Ipswich (*Mechanics' Institute, Tacern Street*).
 Kew (*Library of the Royal Gardens*).
 Leominster (*Literary Institute*).
 London (*House of Lords*).
 — (*House of Commons*).

London (*Hon. Soc. of Gray's Inn*).
 — " " *Inner Temple*.
 — " " *Lincoln's Inn*.
 — " " *Middle Temple*.
 — (*Aeronautical Society*).
 — (*Athenæum Club, Pall Mall*).
 — (*British Horological Institute*).
 — (*General Post Office*).
 — (*Institution of Civil Engineers*).
 — (*Odontological Society*).
 — (*Royal Society*).
 — (*United Service Museum*).
 Manchester (*Literary and Philosophical Society, George Street*).
 — (*Mechanics' Institution, David Street*).
 Newcastle-upon-Tyne (*North of England Institute of Mining Engineers*).
 Oxford (*Bodleian Library*).
 Stretford, near Manchester (*Mechanics' Institute*).
 Swindon, New (*Mechanics' Institute*).
 Tamworth (*Library and Reading Room, George Street*).
 Yarmouth, Norfolk (*Public Library, South Quay*).

British Colonies and Foreign States.

British Columbia—*Mechanics' Institute, Victoria*.
 — *Public Library, New Westminster*.
 France—*Academy of Science, Paris*.
 Germany—*Kaiserliche Universitäts und Landes-Bibliothek, Strasburg*.
 Netherlands—*Bibliothèque de l'Ecole Polytechnique de Delft*.
 Russia—*Imperial Technological Institute, St. Petersburg*.
 Turkey—*Literary and Scientific Institute, Smyrna*.
 United States—*American Academy of Arts and Sciences, Boston*.
 — *American Institute, New York*.

United States.—*American Society of Civil Engineers, New York*.
 — *Industrial University, Champaign, Illinois*.
 — *Mechanics' Institute, San Francisco*.
 — *Mercantile Library Association, Pittsburgh, Pennsylvania*.
 — *Odd Fellows' Library Association, San Francisco*.
 — *Smithsonian Institute, Washington*.
 — *Wabash College, Crawfordsville, Indiana*.
 — *Young Men's Christian Association, Scranton, Pennsylvania*.

PATENT OFFICE MUSEUM, SOUTH KENSINGTON.

THIS Museum is open to the public daily, free of charge. The hours of admission are as follows :—

Mondays, Tuesdays, and Saturdays, 10 A.M. till 10 P.M.

Wednesdays, Thursdays, and Fridays, from 10 A.M. till 4, 5, or 6 P.M., according to the season.

If any Patentee should be desirous of exhibiting a model of his invention in London, he may avail himself of this Museum, which has been visited since its opening on the 22nd June 1857 by more than 3,437,000 persons. The model will be received either as a gift or loan ; if deposited as a loan, it will be returned on demand. Before sending a model it is requested that the size and description of it shall first be given to the Superintendent of the Patent Office Museum. No charge is made for the exhibition of models.

GALLERY OF PORTRAITS OF INVENTORS, DISCOVERERS, AND INTRODUCERS OF USEFUL ARTS.—This Collection, formed by Mr. Woodcroft, and first opened to public view in 1853, is now exhibited in the Patent Office.

Presentations or loans of Portraits Medallions, Busts, and Statues, in augmentation of the Collection, are solicited. They will be duly acknowledged in the Commissioners of Patents' Journal, and included in the next edition of the Catalogue.

All communications relating to the Patent Office, or to the Museum and Portrait Gallery, to be addressed to B. WOODCROFT, Clerk to the Commissioners of Patents and Superintendent of the Patent Office Museum, at the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

LONDON:

Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.

December, 1874.



1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. The text suggests that organizations should implement robust systems to track and document every aspect of their operations, from procurement to sales.

2. The second part of the document addresses the challenges associated with data management and security. It highlights the need for organizations to protect their sensitive information from unauthorized access and breaches. The text recommends the use of secure storage solutions and the implementation of strict access controls to ensure that data remains confidential and intact.

3. The third part of the document focuses on the importance of regular audits and reviews. It states that periodic audits are necessary to identify any discrepancies or irregularities in the records. The text suggests that organizations should conduct both internal and external audits to ensure that their records are accurate and compliant with relevant regulations and standards.

4. The fourth part of the document discusses the role of technology in improving record-keeping and data management. It mentions that the use of digital tools and software can significantly enhance the efficiency and accuracy of record-keeping processes. The text suggests that organizations should invest in modern technology solutions to streamline their operations and reduce the risk of human error.

5. The fifth part of the document concludes by emphasizing the overall importance of maintaining high standards of record-keeping and data management. It states that these practices are fundamental to the success and sustainability of any organization. The text encourages organizations to adopt a proactive approach to record-keeping and data management, ensuring that they are always up-to-date and compliant with the latest requirements.

